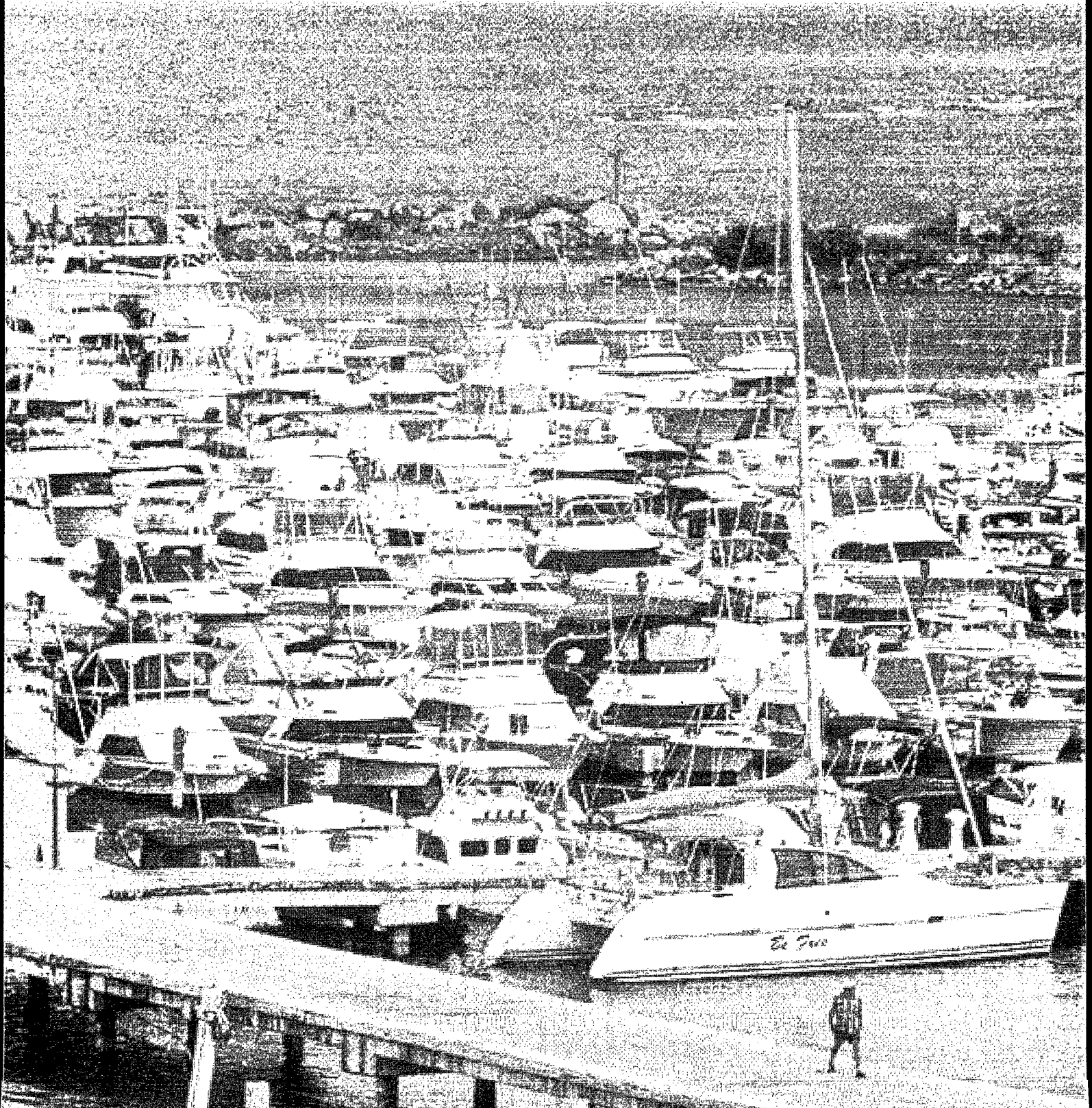




Clean Marinas— Clear Value

Environmental and Business Success Stories



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Cover photograph: Puerto del Rey Marina, Fajardo, Puerto Rico. Photo by Neil Ross.

CLEAN MARINAS—CLEAR VALUE

Environmental and Business Success Stories

prepared for:

United States Environmental Protection Agency
Office of Wetlands, Oceans, and Watersheds
Assessment and Watershed Protection Division
Washington, DC

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under subcontract to:

Tetra Tech, Inc.
EPA Contract No. 68-C3-0303
Work Assignment No. 2-89

August 1996

Acknowledgments

While the number of marina facilities nominated and volunteering for this Clean Marinas—Clear Value project far exceeded the scale of this project and not all could be included, Neil Ross Consultants (NRC) recognizes and thanks the following people for helping to identify the best clean marinas in the nation: Duncan Amos, Armin Cate, Al Davidson, Kevin Fitzpatrick, Peter Foote, Ric Golding, Frank Herhold, Clay Huntress, Mike Keyworth, Ted Lotz, Nathalie Peter, Mark Razny, Mike Stenberg, Jay Tanski, Bob White, and Julie Wright.

Funding for this project was made available by the U.S. Environmental Protection Agency. NRC expresses its thanks to Geoffrey Grubbs and Ed Drabkowski at EPA for their guidance and encouragement, and to Sam Pett at Tetra Tech, Inc., for his calm advice and support.

Any project of this scope always has individuals who give extra cooperation in planning, gathering information, and assisting, and NRC thanks Mark Amaral, Maureen Devitt, Larry Innis, Mike Keyworth, Robert Pacific, Captain Richard Permenter, Tim Tyrrell, and Julie Wright. Cooperating federal agencies included EPA, NOAA, U.S. Fish & Wildlife Service, U.S. Coast Guard, and individual State Sea Grant Programs. Cooperating marina industry organizations included International Marina Institute, Marina Operators Association of America, American Boat Builders & Repairers Association, and Marine Industries Association of South Florida.

Special appreciation goes to all the 25 marina/boatyard managers and owners who endured persistent questions and requests for data, and to those visited for enthusiastically showing their great facilities. Their high level of professionalism and creativity in operating some of the cleanest marinas is exciting. Together, they are truly the bow wave of modern marina management for the 21st Century.

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Introduction

Marinas and recreational boating are very popular uses of coastal waters. The growth of recreational boating, along with the growth of coastal development in general, has led to a growing awareness of the need to protect the environmental quality of our waterways. Because marinas are located right at the water's edge, there is a strong potential for marina waters to become contaminated with pollutants generated from the various activities that occur at marinas, such as boat cleaning, fueling operations, and marine head discharge, or from the entry of storm water runoff from parking lots and hull maintenance and repair areas into marina basins.

When Congress passed the Coastal Zone Act Reauthorization Amendments of 1990, known as CZARA, it required EPA to describe sets of management measures to be used for the control of pollution from various nonpoint sources, including marinas and recreational boating. States will incorporate these measures into their own nonpoint source pollution control programs to help achieve water quality standards. One of the stipulations that Congress made in the law was that the management measures be economically achievable so as not to impose any unnecessary financial hardship on those who will be required to implement the management measures. EPA, therefore, did complete economic analyses

that demonstrate the economic achievability of the management measures for marinas and recreational boating in its Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters.

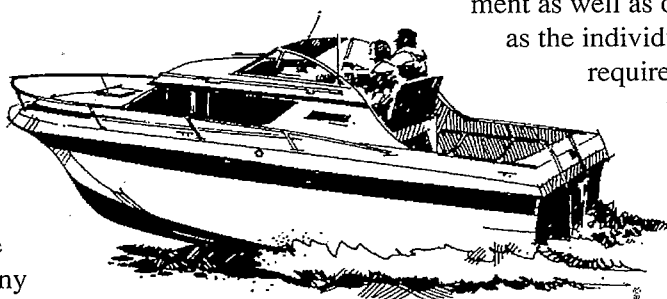
This study focuses on the economic benefits realized by marina managers who have implemented management measures at their marinas. The following sections describe how the study was done, the findings of the study, and each of the marinas selected to demonstrate how application of one or more of the management measures can result in economic benefit to a marina. The study was limited to 25 marinas, but during the course of the study, many more outstanding examples of how environmentally sound marina management can result in economic benefits were discovered.

It is noted that many of the marinas discussed in these case studies also have obtained NPDES permits for stormwater discharge management as well as other permits as the individual states may require. The objec-

tive of both CZARA and the NPDES stormwater permit programs is the same, which is to

achieve improved water quality and a reduction in runoff pollution.

This study focuses on the economic benefits realized by marina managers who have implemented management measures at their marinas.



I. Findings of the Study

Every marina has active solid waste management and public education programs.

Clearly, the marina industry has begun to embrace the need to promote clean boating, clean facilities, and clean operations. The case studies presented highlight good examples of clean marinas that have found clear value in their environmental improvements.

Each of the 25 case studies in this report illustrate different lessons learned from implementation of many of the 14 coastal management measures applicable to marinas,¹ but with interesting variations on best management practices (BMPs).

Table 1 shows the management measures used in the marinas reported. Note that the "O"s on the table represent the management measures highlighted in the discussion of each marina. These marinas were chosen for their differences to illustrate the range of approaches to common problems.

- Every marina has active solid waste management and public education programs.
- All but one have pumpout stations and are promoting their use. Most have issued marina no-discharge regulations. Eight were highlighted here for the way they promote or use pumpout service.
- Nearly 90 percent have been involved in shoreline stabilization, storm water runoff control, liquid material management, and petroleum control.
- Over 70 percent have improved their fuel docks and boat-cleaning practices.

- Four marinas are actively involved in aquaculture or restocking programs—Cedar Island (scallop farming), Deep River (Atlantic salmon release), Oak Harbor (Coho and Chinook salmon rearing and release), and Puerto del Rey (sea turtle rescue). They illustrate the very interesting potential for widespread habitat enhancement and fish farming in marinas. And they demonstrate that marina basins can indeed be healthy and productive ecosystems.
- Surprisingly, only 28 percent found sportfishing activity high enough to need cleaning stations.
- Two marinas met or exceeded the requirements for all 14 of the federal coastal management measures applicable to marinas—Elliott Bay and the Hammond Marina. Both are America's newest megamarinas,² opened within the past 5 years, and were required to contend with environmental requirements that did not exist when most of the nation's marinas were built between 1950 and 1980.

Some of the examples are very simple and inexpensive, whereas others are complicated and costly. All of them, once understood, make common sense. That is not to imply that all will work well everywhere—because they won't.

Any marina manager who reads this report will find one or several very practical practices well worth trying, perhaps with some adaptation for his or her site and operation.

¹ USEPA, "Management Measures for Marinas and Recreational Boating," chapter 5 in *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters* (Washington, DC: U.S. Environmental Protection Agency, 1993, EPA 840-B-92-002). The management measure for boat operation, also included in the EPA guidance, is not intended to be applied by marinas.

² Megamarinas are defined by NRC as marinas having 1,000 or more boat slips.

Table 1: Management Measures Used in Marinas Reported

Management Measures for Marinas and Recreational Boating, EPA CZARA 6217 Guidance, Chap. 5

Marina Facility, State	Marina Flushing	Water Quality Assess.	Habitat Assess.	Shore Stabilization	Storm Runoff Control	Fuel Station Design	Sewage Facility	Sewage Facility Maint.	Solid Waste	Fish Waste	Liquid Material	Petro-leum Control	Boat Cleaning	Public Ed.	MM Use Total	MM Use %
1. All Seasons Marina, NJ	X			X	X	X	X	X	O		X	X			X	71
2. Associated Marine Technologies, FL					O				O		X			X	4	29
3. Battery Park Marina, OH				X		X	O	O	X	X	X	X	X	X	10	71
4. Brewer's Cove Haven Marina, RI				X	X	X	O	O	X		X	X		X	9	64
5. Cap Sante Marina, WA	X			X	X		X	X	O		O	X		X	9	64
6. Cedar Island Marina, CT	X	O	O	X	X	X	X	X	X		X	X		X	12	86
7. Conanicut Marine Services, RI	X			X	O		X	X	X		X	X	X	X	10	71
8. Deep River Marina, CT		X		X	O	X	O	O	O		X	X	X	X	11	79
9. Edwards Boatyard, MA			X	X	X	X	O	O	O		O	X	X	O	11	79
10. Elliott Bay Marina, WA	X	X	O	X	X	X	X	X	O	X	O	X	X	X	14	100
11. Green Cove Marina, NJ	X			X	X	X	O	O	O		X	X	X	X	11	79
12. Hall of Fame Marina, FL				X			O	O	X					X	5	36
13. The Hammond Marina, IN	X	X	O	X	X	X	X	X	X	X	X	X	X	X	14	100
14. Harbour Towne Marina, FL				X	O	X	X	X	O	X	X	X	X	X	11	79
15. Kean's Detroit Yacht Harbor, MI				X	X	X	O	O	X		X	X		X	9	64
16. Lockwood Boat Works, NJ				X	O	X	X	X	X	X	X	X	X	X	11	79
17. Lodge of Four Seasons Marina, MO				X		X	X	X	O		X	X	X	X	9	64
18. Oak Harbor Marina, WA	X	X	X	X	X	X	O	O	X	X	X	X	X	X	14	100
19. Port Annapolis Marina, MD		X		X	O		X	X	O		X	X	X	X	10	71
20. Puerto del Rey Marina, PR	O	X		X	X	X	X	X	X		X	X	X	X	12	86
21. Summerfield Boat Works, FL					O		X	X	O		X	X	X	X	8	57
22. West Access Marina, IL		X	X		X		X	X	X		O	X	X	X	10	71
23. Winter Yacht Basin, NJ				X	X	O	X	X	X		X	X	X	X	10	71
24. Brewer Yacht Yards (15), NY		X	X	X	X	X	X	X	X		X	X	X	X	12	86
25. Westrec Marinas (50+), CA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	14	100
Total management measures users	10	10	8	22	22	18	24	24	25	7	24	23	18	25	260	
Percent using management measures	40	40	32	88	88	72	96	96	100	28	96	92	72	100	74	
No. of examples as primary management measures described in report	1	1	3	0	7	1	8	8	11	0	4	0	0	1		

KEY: X = Management measure used at marina O = Primary management measure described in case study

Marinas Going Clean

Every marina included in this study, as well the many others contacted that do not appear here, is demonstrating innovation, determination, and an almost missionary zeal for clean operations. It seems that once facility owners and managers take the first few steps to protect the environment, they quickly take many other steps toward facility improvement. And the process continues as they strive to become even better after seeing the positive reaction of their customers following environmental progress.

To understand the range of best management practices used by the facilities in this report, look at all of the narratives. Each one tells a different story. Each story describes one major practice in some depth, and mentions others, but this report does not describe everything done in every marina. (If it did, it would quadruple in size.)

Interestingly, the majority of marinas in this report made environmental changes voluntarily because they wanted both to improve their service to boaters and to stay ahead of the regulations. Three marinas, however, did so as a direct result of being told to do so by a local or state regulatory agency, but in every case they exceeded the minimum and went on to make enhancements well beyond their instructions. Not one regretted making environmental changes. All felt good that their business activities were also better, and they have plans to continue making headway toward cleaner marinas and clean boating.

Benefits clear

All of the managers were pleasantly surprised with the results when asked to determine the benefits derived from the environmental changes they have made. Table 2 lists the general benefits from environmental changes.

When asked to describe costs/benefits, some managers easily found accounting figures to demonstrate an economic advantage. For many others, the request required digging, analysis, and in many cases best estimates. When their numbers were set to paper, all were very pleased with their cost-to-benefit comparisons. The case studies in this report make clear that real, measurable bottom-line benefits can result from cleaner operations. Table 3 and Figure 1 show costs/benefits for the clean marina examples.

Clean is not cheap

One caution while reading this report: Do not assume that all environmental improvements and changes result in measurable benefits. They don't, according to the managers. However, each manager quickly added a statement that "environmental protection is just part of the cost of doing business today along the waterfront. We've got to do what we can to have good water quality for the sake of our business."

Many environmental and regulatory compliance costs are not directly billable to boats, such as manager's planning time, staff training, permits, consultants, physical changes, landscaping, restroom modernization, traps, filters, and supplies. To counter those costs, some full-service marinas are adding an environmental surcharge on all sales, slip charges, and billable service work. The rates generally range from 1 to 2.5 percent, with the revenues going into dedicated accounts for environmental improvements. It is particularly noteworthy that both chains in this study—Brewer Yacht Yards and Westrec Marinas—are using surcharges. It is likely that similar surcharges will soon be a common practice in the marina industry. Several managers use the income from recycled cans and metals for end-of-year cash bonuses for staff. One boatyard spends that money for landscape flowers.

Table 2. General Benefits from Environmental Changes.

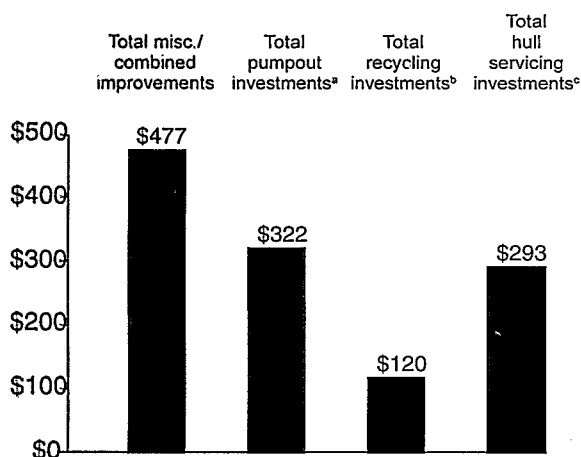
Environmental change	Benefits to marina	Environmental benefits
Hull servicing improvements	<ul style="list-style-type: none"> • reduced costs for cleanup and disposal • better service to customers • pressure wash pads and filters comply with regulations • tarps and filter cloths beneath boat repairs save on cleanup costs • dustless sanding reduces cost, cleanup and adds rental income • satisfied customers • lower material and cleanup costs • increased worker productivity 	<ul style="list-style-type: none"> • reduces silica/bottom paint residue, which can escape to marine environment • reduces amount of other pollutants that escape into marine environment • recycles wash water, filters out contaminants before entering municipal sewer system • eliminates flying dust for worker safety and cleaner grounds
Providing full pumpout services	<ul style="list-style-type: none"> • attracts new customers • satisfied customers when marina staff does pumpout • additional business for other marina profit centers (e.g., fuel, visiting megayachts) • lower municipal sewage system fees (when metered) • improvement of overall business image • state and federal grants available for pumpouts • staff incentives • "free" positive publicity 	<ul style="list-style-type: none"> • reduces sewage discharge from boats in marina • reduces impact on area shellfish and other marine life • water quality perceived by boaters to be cleaner
Recycling of solid wastes at marina	<ul style="list-style-type: none"> • seaweed removal improves appearance of water surface • added income, e.g., battery and scrap metal sales • cost savings for disposal services • positive environmental image 	<ul style="list-style-type: none"> • creates natural fertilizer and garden mulch • less litter in water and on shore • less trash sent to landfill
Pet waste management	<ul style="list-style-type: none"> • keeps docks and marina cleaner for customers • brings customer good will 	<ul style="list-style-type: none"> • reduces fecal contamination of water
Recycling liquid materials	<ul style="list-style-type: none"> • reduces disposal costs and long-term liability • burning used oil reduces heating costs and expands repair business in winter 	<ul style="list-style-type: none"> • reduces spills and contamination • converts waste liquids into reusable products
Improved flushing of enclosed waters	<ul style="list-style-type: none"> • attracts more customers 	<ul style="list-style-type: none"> • improves quality and clarity of enclosed waters
Aquaculture beneath marina's floating docks	<ul style="list-style-type: none"> • additional use of water column under dock space for potential profits • "free" positive publicity, attracts visitors and recognition 	<ul style="list-style-type: none"> • increases amount of available habitat for aquatic organisms • reintroduction of shellfish to harbor
Metered pumpout and marina sewer line	<ul style="list-style-type: none"> • cost savings when sewage bill is based on actual water consumption 	<ul style="list-style-type: none"> • monitoring of sewage and water use levels
Locating boatyard inland	<ul style="list-style-type: none"> • lower-cost land purchase and property tax • coastal permits not required • adds boat moving business opportunity 	<ul style="list-style-type: none"> • eliminates chance of runoff into waterway
Use of environmental contracts	<ul style="list-style-type: none"> • combines education with control and enforcement • controls outside contractors 	<ul style="list-style-type: none"> • potentially reduces all types of pollutants • increases public knowledge and awareness
Permeable land surface	<ul style="list-style-type: none"> • less costly than paved blacktop 	<ul style="list-style-type: none"> • reduces runoff pollutants • reduces solids going to landfill
Fueling management	<ul style="list-style-type: none"> • avoids spills and potentially costly cleanup, fines • special personal watercraft (PWC) dock attracts young customers 	<ul style="list-style-type: none"> • reduces fuel spillage

Table 3: Costs/Benefits of Clean Marina Examples.

Environmental change(s)	Initial investment	Years to amortize	Annualized cost of investment	Change in annual operations costs	Change in annual revenue	1995 net benefits from environ. change	Notes
1. Trash recycling - All Season's Marina, NJ	\$5,000	10	\$648	(\$4,100)	\$0	\$3,452	Net benefit is estimated by avoided trash removal cost less estimated labor costs for recycling.
2. Closed-loop hull-blasting system with reused plastic blasting medium - Associated Marine Technologies, FL	\$25,849	5	\$5,971	\$8,617	\$58,173	\$43,585	Income from entire hull-blasting operation; difference in costs and revenues from conventional system revenues unknown; system installation required by county to continue service.
3. Pumpout service used as staff incentive - Battery Park Marina, OH	\$2,450	10	\$317	\$20	\$12,500	\$12,163	Improved staff morale and productivity.
4. Sewage meter for pumpout station and entire marina - Brewer's Cove Haven Marina, RI	\$6,800	10	\$881	(\$2,603)	\$0	\$1,722	Savings from metered sewage flow; federal and state grants paid for installation of meter; however, initial cost included here to demonstrate benefits even with full cost.
5. Public education and free recycling - Cap Sante Boat Haven, WA	\$0	N/A	\$0	(\$10,800)	\$0	\$10,800	Waste disposal savings, less the cost of renting recycle bins.
6. Habitat assessment and scallop farming under docks - Cedar Island Marina, CT	\$0	20	\$0	\$33,500	\$46,000	\$12,500	Cost of docks no more than conventional docks; operations costs are biologists' salaries; cost savings from extended dredging season; in addition to net benefits, \$5,000 of annual "free publicity" is attributed to improvements.
7. Inland boatyard and repair sites - Conanicut Marine Services, RI	(\$1,807,000)	20/10	(\$138,688)	(\$72,125)	\$75,000	\$285,813	Initial land savings on buying inland v waterfront, includes permit saving; land amortized over 20 yrs, trailer over 10 yrs; property tax and land value savings are estimated to demonstrate benefit of inland yard.
8. Overall changes: pumpout service, dustless sanders, ground maintenance - Deep River Marina, CT	\$21,000	10/5	\$3,329	\$13,000	\$86,800	\$70,471	Additional benefits from new slip rentals, winter storage, added fuel sales; additional value was realized from "free publicity"; pumpout amortized over 10 yrs, sanders over 5 yrs.
9. Overall changes: environmental contract, pumpout service, solid waste and liquid materials management - Edwards Boatyard, MA	\$116,400	20/10	\$9,459	\$18,100	\$100,000	\$72,441	Pumpout cost amortized over 10 yrs, other investments over 20 yrs; also attributed the equivalent of \$10,000 of "free publicity."
10. Overall changes: habitat creation, pollution control, water conservation, etc. - Elliot Bay Marina, WA	N/A	1	N/A	(\$3,620)	\$0	\$3,620	Savings from avoided hazardous waste pickup paid for labor time; dog waste bags, distributed free to customers, save labor costs.
11. Overall changes: wash water recycling, trash recycling, portable pumpout station - Green Cove Marina, NJ	\$6,800	10	\$881	(\$750)	\$28,700	\$28,569	Change in costs are added labor and service costs less savings from decrease in disposal services; initial outlay for portable pumpout and recycling setup less permit savings; pumpout partially paid for with state grant but full initial cost included here to demonstrate benefits even with the full cost.

Environmental change(s)	Initial investment	Years to amortize	Annualized cost of investment	Change in annual operations costs	Change in annual revenue	1995 net benefits from environ. change	Notes
12. Pumpout capabilities at every dock - Hall of Fame Marina, FL	\$16,200	10	\$2,098	\$3,788	\$300,000	\$294,114	Increased revenue due to special dockside pumpout service.
13. Seaweed recycled as garden fertilizer and mulch - The Hammond Marina, IN	\$0	N/A	\$0	(\$800)	\$0	\$800	Expected to save \$17,500 on weed control in 1996.
14. Filtration of pressure wash water - Harbour Towne Marina, FL	\$46,415	10	\$6,011	\$24,000	\$270,000	\$239,989	Difference in revenues and costs compared to conventional system unknown; system installation required by county to continue service.
15. Full-service pumpout and fueling - Kean's Detroit Yacht Harbor, MI	\$12,000	10	\$1,554	\$1,040	\$11,000	\$8,406	New revenue from dockside pumpout and fuel services.
16. Recycled crushed concrete controls runoff - Lockwood Boat Works, NJ	(\$360,000)	20	(\$28,888)	\$0	\$0	\$28,888	Initial investment is negative because of savings of using recycled concrete surfacing rather than blacktop.
17. Dustless vacuum sanding - The Lodge of Four Seasons Marina, MO	\$3,724	5	\$860	\$8,643	\$20,000	\$10,497	Net of initial outlay and estimated labor and materials cost; saved 30% of conventional costs; difference in revenues unknown.
18. Floating pumpout and restroom barge to serve transients - Oak Harbor Marina, WA	\$0	N/A	\$0	(\$5,230)	\$0	\$5,230	State grant funded \$58,600 cost of pumpout barge. The city hauls the marina's septic waste for free, which saved an equivalent of \$8,220 in septic hauling cost.
19. Outdoor boat repairs done over screen tarps - Port Annapolis Marina, MD	\$2,000	1	\$2,000	(\$2,000)	\$2,000	\$2,000	Savings on cleanup costs, less the cost of labor and screen tarps.
20. Opening in breakwater to improve flushing - Puerto del Rey Marina, PR	\$30,000	20	\$2,407	\$0	\$50,000	\$47,593	Additional dock rental income attributed to better water quality.
21. Wash water recycled without chemicals - Summerfield Boat Works, FL	\$30,075	10	\$3,895	\$3,300	\$93,750	\$86,555	Savings in water cost.
22. Used oil burner installed to heat boat repair building - West Access Marina, IL	\$7,000	10	\$907	(\$9,894)	\$9,495	\$18,482	Cost savings on disposal and energy, less annual maintenance costs, plus additional boat repair income.
23. Floating personal watercraft (PWC) fueling dock prevents spillage - Winter Yacht Basin, NJ	\$3,138	10	\$406	\$400	\$6,366	\$5,560	Additional personal watercraft fuel sales business.
24. Environmental changes at boatyard chain - Brewer Yacht Yards; NY, CT, RI, MA, ME	N/A	N/A	N/A	N/A	N/A	+	No calculations because chain-wide efforts made it difficult to attribute benefits to any one particular change; owners, however, felt strongly that chain-wide improvements made good business sense.
25. Environmental changes at marina chain - Westrec Marinas, Inc.; national	N/A	N/A	N/A	N/A	N/A	+	[Same note as above]

Figure 1: 1995 Net Benefits from Environmental Improvements



- a Pumpout investments have in some cases been covered by state and federal grants.
- b Recycling of trash, water, and fuel have saved many firms money.
- c There are a variety of hull servicing improvements, including dustless sanders, closed-loop systems, and special screen tarps to trap debris.

Environmental contracts work

Environmental contracts between the marina and its customers, outside contractors, and staff have apparently worked well where they have been used. The contracts were demonstrated to be a key element in the education process and displayed the very serious intention of managers to make their marinas more environmentally compatible. Contract language was consistent with the facilities' best management practices (BMPs) or storm water pollution prevention plans (SWPPPs).

Most of the managers with such contracts have used them to enforce their rules. Many report the loss of a few customers at slip renewal time, but those were soon replaced with customers who supported clean operations. Contracts resulted in tighter control on and reduction in the number of outside contractors doing boat repairs on the marina property. All the managers indicated that their operations are much cleaner after "banging a few heads." The marinas prospered with the customers who remained and were happier with the clean marina philosophy.

Rates higher, occupancy higher

During the interviews, marina managers and owners were asked how their occupancy and rates compared to those of other facilities nearby in their boating market area. All but one said, "Our rates and occupancy are higher."

They generally believed that their visible efforts to operate clean marinas translated into customer confidence that management would also give extra care to the boats. Plus, an increasing percentage of the public today wants to use only nice, clean, service-oriented facilities. And it seems that a growing percentage of the boating public, according to these managers, is willing to pay a higher slip cost for a better and cleaner facility.

Permits easier to get?

"Not so," responded most marina managers when informally asked that question. "But now that we are recognized as an environmentally proactive facility, the regulators are easier to talk with and give us fewer hassles," they usually added. Several managers proudly reported that their facilities have been used by state regulators as showplaces for visitors or for training purposes.

The benefits of becoming environmentally compliant may be somewhat limited, although positive, when it comes to dealing with coastal and environmental regulators.

Marina owner/managers are leaders

All of the owners and managers interviewed strongly advocate environmental protection as an essential everyday part of their boating business. They each started the change process for different reasons over the past 4 to 6 years, but all discovered that successful marinas and clean water go hand in hand. By the range of ways they responded to the clean marina challenge, they illustrated the creativity and problem-solving genius so widely found in the marina and boatyard industry. They were innovators who succeeded.

Nearly all of these owners and managers are active in state and/or regional marine trade association. The majority belong to multiple national organizations that have been proactive on environmental issues, including the International Marina Institute (IMI), Marina Operators Association of America (MOAA), and American Boat Builders & Repairers Association (ABBRA). Several have achieved professional recognition as IMI Certified Marina Managers (CMMs). There seems to be a positive relationship between industry activism and environmentalism.

Recognition spreads the good word

State and federal agencies could develop positive incentives and recognition for those marinas and boatyards that are doing their best to reduce their environmental impacts. Without some clear benefits from the regulations, many other managers will continue to say "What's the use of complying?"

A few federal and state agencies have given public recognition to several of the marinas interviewed, and the certificates are proudly displayed where customers can see them. The boating industry—particularly national trade associations and magazines—has started to highlight clean marinas as outstanding examples for others to follow.

Each of the 25 marinas and boatyards in this report have been recognized with a certificate from the U.S. Environmental Protection Agency as a nationally outstanding clean marina.

Job done yet?

Are any of these marinas finished making environmental improvements? Not likely.

"When we started to clean up the yard several years ago," Mike Keyworth³ explained, "our customers gave us many

compliments. So we kept on cleaning up and making improvements. And they complemented us more and more, which made us feel good. The thing about this process is that once we started, the more we wanted to do."

Without realizing it, Keyworth spoke for everyone in this report.

Predictions

Considering the relatively short duration of this study, the number and range of cases studied were but the bow of the clean marina movement. There are undoubtedly hundreds of other marinas with stories as good as, or better than, those found in Section III.

It is more than likely that sometime in the future:

- 75 percent of the estimated 8,000 to 10,000 marina facilities in the United States will make significant environmental improvements, with the rest making some changes more slowly.
- Environmental surcharges will be common nationwide.
- Marina professionals will promote national or regional no-discharge adoption.
- Clean marinas will quickly become the norm.
- Those marinas which do not clean up will probably not be in business as the 21st Century dawns.

Sometime in the future marina managers and coastal authorities will look back at this report, read the examples, and say "What's so different about these practices? Isn't everyone in boating doing these as a natural part of their business?" That's the point.

Remember, in 1995 these marinas were the exceptions. The managers and owners were pushing a new, clean marina wave of change. They were the leaders of their time who defined, innovated, and demonstrated practices that would become common in 5 to 10 years.

³ General manager, Brewer's Cove Haven Marina, RI

The recognition that clean water is essential to good boating and profitable marina business is spreading rapidly and will not be turned back. Read the stories of how and why 25 leading managers achieved environmental and business success by demonstrating that clean marinas bring clear value.

Economics Benefits Summary

The magnitude of economic returns that clean marinas and boatyards have realized from their investments is illustrated in Table 3 and Figure 1. By totaling the initial outlays and 1995 net returns according to general types of improvements made, the chart shows that on average, owner investments have more than paid for themselves.

- Hull servicing improvements included investments in the following: a closed-loop hull-blasting system that reuses plastic pellets; dustless sanders; screen tarps to catch debris; and installation of filtered pressure wash water systems away from the shore. Net benefits in 1995 ranged from covering cost to earning many times their investment by creating new business.
- Waste management investments included recycling and/or reuse of trash, milfoil seaweed (as mulch), wash water, and waste oil. This approach primarily brought savings from reduced disposal costs. In the case of the Lodge of Four Seasons, use of waste oil to heat a work building created an additional winter repair business. Trash recycling typically cost very little to implement, with significant annual savings particularly for marinas located in communities with active recycling programs.
- All but one of the marinas and boatyards in this study had pumpout facilities in place. These eight pumpout services had benefits ranging from savings on sewer fees and additional fuel sales attributed to their

convenient pumpouts to attracting more megayacht visits. Two marinas used the pumpout station as a competitive incentive program for summer employees. In many cases, the costs of new or improved pumpout equipment were covered by grants.

- Two environmentally sound investments actually saved owners a great deal of money on the initial outlay. By purchasing inland acres for boat repair and storage—away from coastal waters—Conanicut Marine paid much less for the land than it would have if the boatyard were shoreside. It also saved annually on much lower property tax bills. The innovative owner of Lockwood Boat Works paved the boatyard's parking and work yards with crushed recycled concrete, saving hundreds of thousands compared to blacktop pavement, which would also have created a runoff problem.
- A wide variety of other environmental improvements had been made by the facility owners interviewed. As stated previously, not all changes at each facility were included in this analysis. Some owners and managers had made such facility-wide changes that it was not possible to identify benefits from any one given change. But each of those managers felt strongly that their clean marina efforts had been rewarded by free publicity, recognition, and new business.

As these 25 case studies demonstrate, marinas and boatyards across the United States are voluntarily making environmental improvements to their facilities. These public and private operations have realized that the upgrades are good for both the environment and their bottom line. A variety of operational and physical changes have saved money, brought free publicity, and attracted new business.

As final proof of the clear benefits from clean marinas, all the owners and managers in this study are continuing to make more

changes to better their environment, satisfy their customers, and expand their business. They all feel very good about this progress.

Economic analysis: The marina sample—apples, oranges, and coconuts

Marinas that have adopted "best available" environmental measures and practices, and realized positive returns were selected for this study. Every effort was made to represent the widest possible range of marina sizes, geography, operation type, ownership (public and private), and fourteen NPS management measures. However, the set of observations made on these cases did not constitute a random sample, nor was a single statistical population defined. The results could not therefore, be subjected to statistical analysis.

A statistical population can be defined as the totality of all possible observations on measurements or outcomes of an experiment. Like the researcher in physical science, the social scientist would ideally like to generate experimental data. Since experimental data on humans and their business activities is not available, econometricians attempt to adjust for uncontrollable (exogenous) factors in carrying out statistical analyses. But there is always a limit to the adjustments that can be made and the range of observations that can be considered part of the same population.

When a person makes numerical measurements of some objects or actions for the purpose of statistical analysis, the investigator does not measure just a conglomeration of them; rather, has at least previously formulated in mind a reasonably homogeneous group to measure in some respect. For this study as many populations as possible were identified. There was no intent to make an overall measurement on an underlying population.

Furthermore, statistical tests, which are based on the laws of probability, are hard to justify when random samples are not taken from homogeneous populations. Confidence intervals and significance levels have

no meaning unless some degree of sample homogeneity can be assumed.

In selecting this set of marina case studies the focus was on non-homogeneity by deliberately selecting illustrations of different practices or variations of them. The only unifying characteristics in these cases were that the businesses were marinas located on recreational boating waterways and earned a positive economic return from new environmental practices. None of these provided sufficient homogeneity to the population.

While one could have calculated means and variances of the economic returns, these results would have characterized only the site-specific cases studied and would not have been easily generalizable to other marinas or other environmental practices. The random sample for these types of findings would have required statistical populations which included marinas where these and other environmental practices were repeatedly tested and those applications which failed to generate benefits.

Further, standardized questionnaires or surveys were not used to gather statistically comparable data for scientific analysis. Mini-case examples were compiled to illustrate how individual marinas were able to adopt environmental practices which also provided positive benefits.

To the degree possible, economic analysis was made within each marina by comparing business cost to benefits with and without the environmental practice adopted. In cases with non-income benefits, such as public education, other types of benefit descriptors were reported. All findings were based on information provided by the facility owner or manager, and where hard numbers were not available, professional estimates were reported.

NOTE: Economic analysis was prepared by Dr. Timothy Tyrrell, Professor of Resource Economics (Coastal Recreation), College of Resource Development, University of Rhode Island, Kingston, RI).

II. How The Study Was Done

The process of conducting this study was simple, as was the goal to find and describe examples of clean marinas with measurable benefits from their environmental improvements.

Purpose and goal

The purpose of this *Clean Marinas—Clear Value* study was to identify marina and recreational boating operations that have adopted best management practices and programs that have resulted in positive economic benefits. The goal was to produce a document that will help convince many in the marina industry to voluntarily make environmental changes.

Planning the project

A number of marina professionals and technical advisors were contacted for project suggestions, questions to ask, approaches to take, and ways to measure benefits. A program advisory meeting was held in early June 1995 in Washington, DC. It brought together marina industry representatives—MOAA, Boating Industry magazine, Westrec Marinas—and representatives of key coastal environmental agencies—EPA, NOAA, USFWS, U.S. Coast Guard—to launch the project. The participants discussed project purpose, scope, work plan, and selection procedure, and solicited help in promoting clean marina facility nominations. Many excellent suggestions were given and eventually incorporated into the plan.

Publicity

Getting word out about the project and its need to identify clean marinas took several modes:

- Direct contacts were made, via phone, fax, mail, email, and site visits to facilities known to be using good environmental practices.
- Each of the organizations and agencies attending the June meeting followed up by forwarding a call for clean marina nominations to their members or regional staff.
- More than 120 press releases were sent to all major marina industry publications, marine trade associations, marinas, boatyards, marina consultants, and Sea Grant specialists, inviting marina nominations and participation. A copy of the press release is provided in Appendix E.
- To solicit case studies and promote good practices, presentations were made at several marina conferences and meetings, including the National Marine Trades Council, June 10, 1995, New Hampshire, and the MRAA/MOAA American Marine Trades Expo, August 18, 1995, New Orleans, Louisiana.

As a result of this effort, more than 75 marinas volunteered or were nominated; several others made contact too late in September to be considered for the project. Clearly, there are many clean marinas around the country with many good stories to be told.

Selecting clean marinas for study

From the large number of facilities identified, about 40 candidate marinas were selected for a wide variety of environmental measures and practices including location, design, operation and maintenance, and special problems that had been overcome. Final marina selection was determined according to these criteria:

- Applied one or more of EPA's 14 management measures and practices for nonpoint source control applicable to marinas.
- Made effective use of best available off-the-shelf pollution control practices, devices, and innovative technology.
- Achieved demonstrated pollution reduction at the facility.
- Realized clear economic returns and other benefits that could be quantified and described.
- Was a credible example for other marinas and boatyards facing similar concerns.
- Had a good story that differed from others in the study.

Each marina faced a selection triage: (1) appropriate for the study, (2) need more information to be included, (3) inappropriate because it does not meet the selection criteria. In the end, 25 marinas were chosen and appear in this report, 8 were deselected, and 7 others were qualified but were not needed for the study.

Information gathering

A before-and-after comparison of each marina was made to verify any real or perceived economic benefits from environmental improvements. The relationship between environmental improvements and economic benefits was intended to support the premise that "clean" marinas generate clear economic values.

To simplify and help standardize the process, three discussion worksheets were used during marina site visits or telephone conversations with managers about their operations. Those discussion worksheets are provided in Appendix D.

To determine economic benefits, information was gathered regarding new income derived from increased sales, services, and slip rentals; cost savings from improved housekeeping procedures; and increased public visitation and participation due to site cleanliness, clean water, and attractiveness. In most cases the marina manager was able to give actual numbers, numbers rounded to the nearest hundred or thousand, or professional estimates.

In a few instances when managers were uncertain what the economic value was, they were asked to compare current business—commonly slip rental rate and occupancy—to that of similar marinas in the same market area that did not make similar environmental changes. In every case the managers estimated that operating as the "competition" did would likely result in lower occupancy rates and income.

Analysis

This project was not a classic economic study because it reported on many marinas with different environmental practices, in sites with wide-ranging sets of variables. Thus each facility's case study had to stand alone economically, but when taken together the case studies did show a definite pattern of positive business benefits from improvements in environmental practices.

To find a way to cope with samples having many variables, NRC asked Dr. Timothy Tyrrell¹ to help with economic analysis of the costs/benefits for the individual sites included in this report. (Refer to his recommendations in "Economic analysis: The marina sample—apples, oranges,

¹ Professor of Resource Economics (Coastal Recreation), College of Resource Development, University of Rhode Island, Kingston, RI.

and coconuts,” at the end of Section I.) Dr. Tyrrell recommended doing the economic analysis by comparing each marina’s business costs to its benefits, with and without the environmental practice adopted. In cases with non-income benefits, such as public education and publicity, other types of benefit descriptors were identified. All findings reported were based on information provided by the facility owner/manager. When hard numbers were not available, professional estimates were accepted.

The economic benefits in this study included new income derived from increased sales, services, and slip rentals; cost savings from improved housekeeping procedures; costs avoided; improved operation and maintenance procedures; and increased public visitation and participation due to site cleanliness, clean water, and attractiveness.

Writing each case study

This report was written in a common style used in professional marina and boating industry trade magazines. Since the target audience was primarily the owners and managers of marinas across America, a familiar story-telling narrative was used to convey technical information, credible trade logic, and a general positive business sense that “we will do fine” by making environmental improvements. Quotes are used in every case study because the manager’s own words do a better job “talking to” other marina managers than could anyone else’s. Each of the 25 case studies was reviewed twice by the marina owner or manager for accuracy of data, information, and quotes. Each report was also reviewed to ensure data presentation clarity and economic consistency.

III. Case Study Reports

Order of Presentation

The 25 clean marina environmental case studies in this section are organized alphabetically by facility name, with the two marina chains appearing after the individual marinas and boatyards.

Some early thinking was to organize this section by region, but it was felt that readers might focus primarily on their region and miss the full range of practices highlighted. Actually, very few of the practices described are limited to one or two regions; most can be used in almost all states—perhaps with small climate—and market-related modifications. Appendix C contains the full list of marinas, organized by state.

Also considered was organizing cases by type of best management practice, but with so much overlap that was not possible.

initial start-up/construction/purchase costs and annual costs to revenues, cost savings, avoided costs, or other quantifiable benefits. This comparison is also summarized in Table 3 in Section I.

- Environmental improvements - a detailed description of the selected change made, reasons, results, and costs and benefits, plus short descriptions of other environmental practices adopted. These are also summarized in Table 2 in Section I.
- Other improvements and benefits - other short stories of programs that demonstrate additional benefits from operating a clean marina.
- Equipment sources - name and address for the national supplier of each major product used in the prime enhancement described in the case study.

Case Study Report Organization

- Facility name and case study title
- Location - address, telephone, fax, person interviewed, owner, waterbody location. This information was supplied to facilitate communication by others considering similar improvements.
- Environmental change - the practice(s) changed and improved.
- The marina - narrative describing the marina business, employment, boat capacity, and services.
- Management measures - list of up to 14 management measures used in the marina. These are also listed by marina in Table 1 in Section I.
- Costs/benefits (not included in the two chain reports) - comparison of the

1. All Seasons Marina

Mom and Pop Marina Saves With Recycling

Location: 551 Roosevelt Boulevard, Route 623, Marmora,
New Jersey 08223

Telephone: (609) 390-1850 **Fax:** (609) 390-7831

Interviewed: Ralph Dilks, General Manager

Owned by: Marilyn and Ralph Dilks

Waterbody: Peck Bay, on Great Egg Harbor, Atlantic Ocean

Environmental change

Recycling has cut this New Jersey marina's trash volume and removal cost by half.

The small-boat marina with dry-stack storage

The All Seasons Marina is a private, commercial, full-service marina/yard with 300 slips and 225 in/out dry racks for boats. Best described as a home port, the business employs 14 persons year-round with 6 more part-time in the summer. Boat sizes range from just under 20 feet up to 40 feet, with 58% in the 26- to 30-foot range. Other profit centers include transient dockage, launch/haulout, boat rental, pumpout, full retail store, fuel, electronics, and beverage, ice, and bait sales. With many smaller boats, bait and tackle sales have helped boost revenues.

Moving boats in and out of the dry rack building is easy and fast with two large, negative-lift fork trucks. Larger boats are moved with a combination travel lift and hydraulic trailer. Boat services include indoor painting and engine repair.

On a typical busy weekend, about 22%

of the rack-stored boats would be out in use, and about 33% of the boats in slips would be used, with half under way out of the slip. About 5% of the boats in slips would be used overnight. Within a 2-mile radius of All Seasons Marina are one other marina and several lagoons of waterfront homes with docks, raising the total number of recreational vessels kept within that radius to nearly 1,000.

The original marina was built on the site in 1941, just before the beginning of World War II, by Ralph Clayton. In 1963 Ralph and Marilyn Dilks (Clayton's daughter) bought the marina, and they have expanded it and made many improvements over the decades. All Seasons Marina is one of the best examples of "Mom and Pop" marinas in America.

Management measures

All Seasons Marina achieves the marina management measure for solid waste, as well as the measures for marina flushing, shoreline stabilization, storm water runoff control, fueling station design, sewage facility, maintenance of sewage facilities, liquid materials, petroleum control, and public education.

Costs/benefits

All Seasons Marina is a full-service facility including dockage, dry stack storage, boat/engine repair, a retail store, and boat rental, all of which generate considerable trash and solid waste. A commercial pickup and disposal service takes care of the marina's waste material. This year the service would have cost \$1,200 per month in the 6-month boating season, plus \$600 per month in the winter season, for a total of \$10,800. But recycling has halved All Seasons Marina's trash bill, saving \$5,400. Deducting an estimated \$1,300 labor cost for trash separation and cardboard bundling, the net saving this year is \$3,000.

Environmental improvements

To implement recycling, owner Ralph Dilks created 3 distinct recycling areas around the marina and in work buildings, plus 13 smaller disposal areas for separating cans, bottles, and other recyclables from regular trash. The entire operation is very

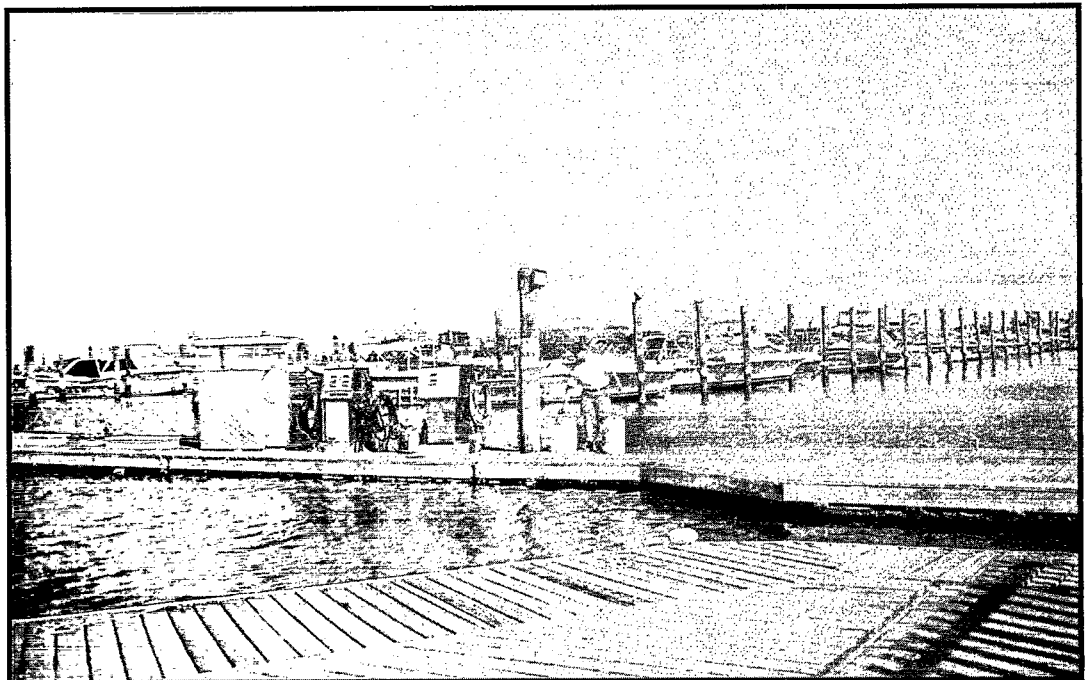
simple and low-budget. "We even recycled some old dock material to make the marina recycling area," Ralph Dilks said, "and utilized drums which we get free." The start-up costs of new lumber, signs, and labor were estimated at \$5,000 and "we wrote that off in the first year, 1986."

We have customers and staff separating the trash, and the township collects bottles, newspaper and office paper, cans, plastics, and cardboard and packaging. All of it goes for recycling at no cost to the All Seasons Marina. As a result, the volume of garbage and other mixed trash commercially picked up for disposal has been chopped by 50%." The recycling costs \$1,300 per year, but saves \$5,400 per year in trash removal fees.

"Any \$3,000 cost reduction in overhead," Dilks said, "is a valuable saving to any small business. And trash fees are expected to go up, so recycling savings will increase each year. And that's good for our business."

By taking advantage of available solid waste recycling programs, Ralph Dilks feels good about "keeping more stuff from

All Seasons Marina's floating dock has 300 slips and a fuel dock. (photo by All Seasons Marina)



going into the town landfill. The town gets paid for the recyclables it delivers, and we end up paying less for trash removal. Everybody wins with recycling.”

“Most customers and all the staff participate, but we have to keep reminding them. Our ship’s store and boat repair business produce a lot of cardboard boxes, which we fold flat and store on a wood pallet for pickup. Cardboard used to be a large part of our trash.” All Seasons’ office and shop staff are good at putting recyclable paper in separate boxes. “It’s surprising how much paper our computers print out,” Dilks exclaimed. “The marina represents a big part of the trash, with about 60% of the volume in the summer, but only about 10% in the winter months.”

“Surprisingly, not all boat owners want to separate their trash. About half our customers come from the City of Philadelphia, where home recycling is not widely practiced. When they come here, they just don’t think about separating their trash.”

The first impression a visitor gets on arriving at All Seasons Marina is its neatness, landscaped beds, and huge American flag waving overhead. About 50% of the car parking area is permeable, allowing rain to be absorbed instead of causing runoff. Several years ago, All Seasons completely rebuilt, enlarged, and upgraded its restrooms. Nearby a covered fish-cleaning station handles the needs of the sportfishing folks. Water used in pressure-washing boat bottoms now is screened, filtered, and reused.

Ralph and Marilyn Dilks pride themselves on running a clean, nicely maintained marina and a well-stocked retail store, with a well-trained staff. They set a good example, widely recognized across the nation, as owners who travel together far and wide to attend training courses to stay on top of the marina and boating business. Ralph is a Director of the Marina Operators Association of America (MOAA).

The Dilkses were early adopters of new technology. For about 25 years they have been successfully using a floating tire breakwater (reusing old tires) to protect the docks and boats from short, choppy bay waves and to prevent shoreline erosion.

The breakwater, as is common for floating dock structures, is a veritable artificial reef and home to a wide range of marine plants and animals.

All Seasons was among the first coastal marinas in New Jersey to install and operate pumpout services, including a homemade portable toilet dump station. “About 10 years ago, a combination of site and regulatory factors made the project less than satisfactory and overly expensive,” said Marilyn Dilks. “Because the marina was originally built in wetlands, we were unable to use a septic system for the pumpout waste. The state rejected our proposal for in-ground holding tanks.” A lack of clear technical information and national guidance on what to do with sewage from boats resulted in the Dilkses installing a state-mandated treatment package plant that ultimately “failed from insufficient seasonal sewage loading—a very frustrating and extremely costly venture for us,” said Ralph Dilks. Currently, the boat effluent goes to state-approved in-ground holding tanks and then is picked up by a commercial septic hauler. Eventually, the town expects to install a sewer line past the business, which will be the final and best solution. All Seasons Marina has applied for a grant to upgrade the pumpout system and to be able to offer the service for free.

To further prevent contaminated storm water runoff from entering the bay, the marina uses inexpensive hay bales around the perimeter of the work yard. This year they are trying out oil absorbers in the drain areas, but haven’t analyzed the effectiveness yet.

“Everyone wins with recycling.”

Each summer seaweed and debris build up in the corners of the marina basin.

"Using our existing deice bubbler system allows us to aerate these areas and improve the water flow." The Dilkses also have observed an appreciable clearing of the water and an increase in fish species within the marina.

"Probably one of the most effective practices is simply getting rid of 'never-to-be-used-again stuff.' Cleaning after storm tides is horrendous enough," Marilyn Dilks said, "without the additional handling of old junk. This includes items kept inside offices and shops also, such as broken tools, extinct files, etc."

"Signs direct boaters to disposal areas, while our requirements and the safety policies are included in our rental agreements. Additionally, All Seasons Marina furnishes a free meeting room for U.S. Coast Guard Auxiliary boating safety courses and is designated as a 'cooperating marine dealer' for the distribution of their educational (safety and environmental) material."

Marilyn and Ralph Dilks know that education—of themselves, their staff, and their customers—is essential to having a successful full-service marina and boat retail business in an environmentally sensitive coastal area.

2. Associated Marine Technologies, Inc.

Closed Hull Blasting Uses and Reuses Plastic Media

Location: 490 Taylor Lane, Dania, Florida 33004
Telephone: (305) 926-0308 **Fax:** (305) 926-7834
Interviewed: Scott Miser, President, and Ted James, General Mgr.
Owned by: Scott and Joyce Miser
Waterbody: Dania Cutoff Canal, off Intracoastal Waterway

Environmental change

This boat repair yard switched from silica wet/dry sandblasting of hulls to a closed system that uses and reuses a plastic medium for blasting.

The boatyard

Associated Marine Technologies is a modern, full-service boat repair yard that specializes in large yachts 50 feet and up, which are common in Fort Lauderdale's waterways. It has 11 slips and 25 out-of-water hardstand spaces for boats awaiting and receiving servicing. There are no seasonal slips, transient visitors, or liveaboards. With 60 full-time employees year-round, this is a no-nonsense yard.

Professional services include haulout and launching, painting, fiberglass repairs, carpentry, welding, metal fabrication, and full mechanical and electrical work. Boats are moved with a 90-ton travel lift.

The boatyard, built in 1984, was bought by the Misers in 1993. "We are a relative new kid on the block (in South Florida)," said Scott Miser. Their next-door neighbor is one of the largest and best known ship-

boatyards in Florida, and next to that is a working commercial shipyard. Yet, "We don't advertise at all," said Ted James. "Word of mouth attracts our customers."

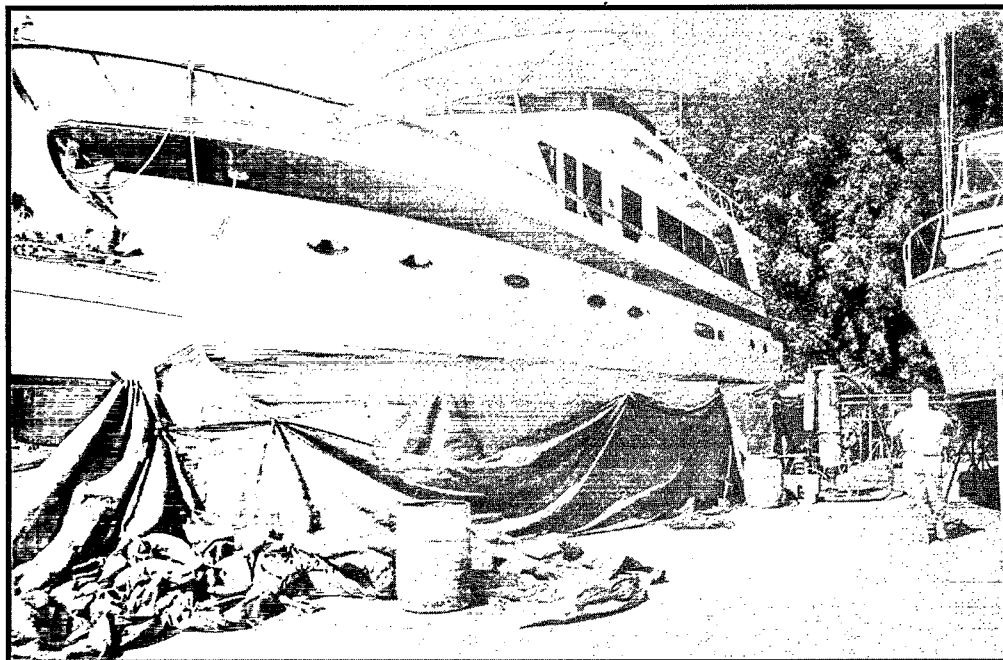
Quality workmanship is easy to see around the yard. The yard's paint work with Awlgrip paint is so superior that the US Paint Corporation introduces new coatings at Associated Marine Technologies before releasing them on the market. The yard was first to use low-volatile-organic-compound (VOC) Awlgrip 2 in 1995.

"We have high-end employees who are very loyal and give quality work," said Miser. "If you don't educate employees, they can put you out of business. We do a lot of training, with 50% to 60% of James' time working on environmental, health, and technical issues including training. Every one of our 60 employees attends one or more training programs annually."

Management measures

Associated Marine Technologies achieves the marina management measures for storm water runoff control and solid waste, as well as liquid materials and public education.

Hull maintenance at Associated Marine Technologies' is done with an innovative closed vacuum system which separates and recycles the plastic medium. (photo by Associated Marine Technologies)



Costs/benefits

Associated Marine Technologies decided in 1994 to make the sandblasting process cleaner and bought a complete blast, recovery, and reclaim system; vacuum; and compressor at a total cost of \$24,229. Training two workers to operate the system cost \$1,620. Annual operation and maintenance costs for the system run \$8,617, plus a 5-year amortized value of the investment, \$25,849 at a 5% interest rate. Gross income from this newly created profit center in 1995 was \$58,173. The net annual income is estimated to be \$43,585, assuming a 5-year amortization, and revenues are expected to continue upward. Clearly, the new process is adding business and savings to this large South Florida boatyard.

Environmental improvements

Associated Marine Technologies runs a very neat, orderly, and well-landscaped facility that is uncommonly clean for a

boatyard. Traditional sandblasting of large boat hulls is a messy job resulting in many hundreds of pounds of spent silica mixed with bottom paint, which all must be swept up and shoveled into barrels for disposal at a landfill. While the sand is relatively cheap, the labor is costly and the marine environment can get dirty.

Instead of silica, Associated Marine Technologies shoots a plastic medium blast (PMB) that can be reused several times until it wears out. The plastic medium is harder than paint and pushes it off, but is not hard enough to strip into the fiberglass gelcoat itself unless desired. Thus the medium is well-suited for removal of antifoulant paint.

Once the antifoulant is removed, the PMB and paint are vacuumed into a hopper, which feeds the mix for medium recovery, cleaning, and reclaiming. The old paint dust is separated and collected, but instead of many barrels for the landfill, less than a gallon of dust remains for disposal from an average 50-foot boat. The ex-bottom paint is dry, feels like clay powder, and is virtually odorless.

"The plastic medium blasting operation reduces our cost of cleanup and disposal, gives a higher-quality surface, and is much less aggressive on the new gelcoat of today."

"The plastic medium blasting operation benefits our business several ways," said Miser. "It reduces our cost of cleanup and disposal, gives a higher-quality surface, and is much less aggressive on the new gelcoat of today."

One of the first major responses to Broward County's best management practices (BMPs) at Associated Marine Technologies "was to add a closed-loop pressure-washing system for boat bottoms we haul out. The new concrete collection pad (facing the travel lift well) and the recycling system cost us \$40,000," explained James, "but we feel good that we are not dumping it all back into the canal, and we comply with the county's BMPs."

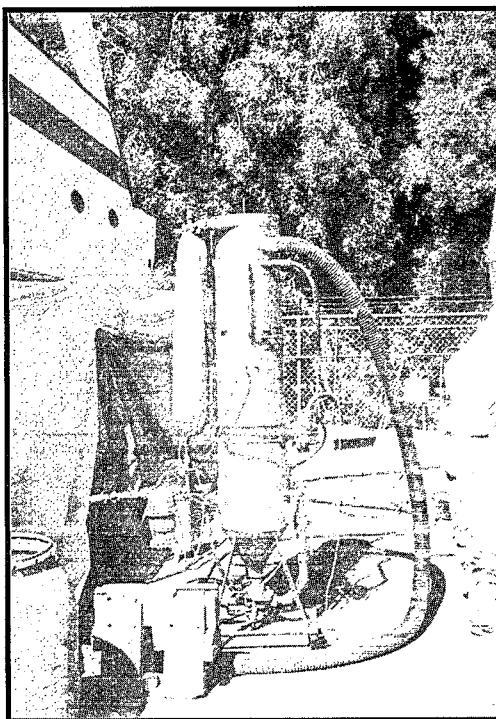
Other environmental improvements include the use of high-volume, low-pressure (HVLV) paint spraying, which limits overspray and gets most of the paint onto the hull surface, rather than into the drifting air. "This saves money by not wasting so much paint," said Miser.

Before work is done on any vessel, the boat owner receives a two-page environmental agreement that must be signed. It explains the yard's best management practices for boat sewage, oily bilge water, petroleum and related products, boat washing, recycling, hurricane preparedness, paint chips, and sanding debris. It closes with: "We thank you in advance for your cooperation in helping us keep A.M.T. South Florida's cleanest, safest boat repair yard."

Other benefits

James stated that "We are a green boatyard on the cutting edge. We take the environment seriously. One of the benefits is that we get a lot of compliments from customers." Both Miser and James firmly believe that "by being an extremely clean yard, we attract quality customers looking for quality hull work. And we give them the quality they expect."

"A clean shop is also a safer shop," James stated. "We have a more professional



High capacity PMB dry stripper and media reclaimer used by Associated Marine Technologies. (photo by Associated Marine Technologies)

operation here, and it is also drug-free. Our employees are good, and they tend to stay with us. We spend a lot of time training and treating them as professionals."

Miser—one of a growing number of marina owners—willingly does more than is required to be environmentally compliant. But he knows it isn't a free ride. "We assess an environmental surcharge of 1% on all repair invoices over \$500. This money is used for further environmental enhancements, training, and equipment. Customers understand the reason for the surcharge and accept it as a fair cost for having quality work done in an environmental, safe boatyard."

Equipment sources

- Surface finishing system: High-capacity PMB dry stripping and media reclaimer, Pram model #23, Pauli and Griffin, 907 Cotting Lane, Vacaville, CA 95688.
- Wash water recycling system: Model #LD, RGF Environmental Systems, 3875 Fiscal Court, West Palm Beach, FL 33404.

3. Battery Park Marina

Pumpout Service Used as Staff Incentive

Location: 701 East Water Street, Sandusky, Ohio 44870
Telephone: 419-625-6142, fax 419-625-7529
Interviewed: Carl Wolf, CMM, Vice President, General Manager, and Philip Doller, Marina Manager
Owned by: Paul and John Pheiffer, Sandusky Bay Development Co.
Waterbody: Sandusky Bay, Lake Erie

Environmental change

Proactive environmental management—including pumpouts and other changes—at this urban marina helps keep Lake Erie clean, turned the marina around economically, and won it a national award.

The first-class urban marina

Battery Park Marina is a private, commercial marina located beside a 5-acre City of Sandusky waterfront public park and tennis courts.

There are 672 floating boat slips for seasonal and transient boaters, with one large dock that has side-by-side fuel and pumpout stations. In addition to very clean restrooms and showers, the marina has a laundry, food and drink service, and ship's store, plus a

leased restaurant.

During May to October 1995, 85% of the slips were rented for the boating season. On a high-use weekend about 50% of the boats would be used, with about 15% of them occupied overnight. Boat sizes range from 16 to 65 feet LOA, with the average at 28 feet. The 70% majority were powerboats, with 30% sailboats. The marina employs 6 full-time staff year-round and another 15 for the boating season.

The original marina was built on the site



in the 1930s as a conversion from an industrial shipyard that had started at the beginning of this century. In 1984, when Paul and John Pfeiffer won a city contract to rebuild the then-closed docks and manage the property, they hired Carl Wolf as general manager. They reopened for business in May 1986. The City of Sandusky is the landowner. Within a 2-mile radius of Battery Park, there are 7 other marinas, serving an estimated area boat population of nearly 5,000 boats around the bay.

Battery Park Marina has been nationally credited with helping to revitalize the Sandusky waterfront, increase tourism for the entire community, and demonstrate responsible environmental leadership in the marina industry.

Management measures

Battery Park Marina achieves the marina management measures for sewage facility and maintenance of sewage facilities, as well as shoreline stabilization, fueling station design, solid waste, fish waste, liquid materials, petroleum control, boat cleaning, and public education.

Costs/benefits

Battery Park Marina pumped out more than 1,000 boat holding tanks in 1995. The amortized annual cost of the pumpout and dump station is estimated to be \$317, along with a \$20 annual maintenance cost. Pumpout income for 1995 was \$1,500, and the pumpout service increased fuel sales volume by an estimated \$11,000. The estimated total net benefit of the pumpout service was \$12,163 for 1995.

Environmental improvements

With the Great Lakes already designated no-discharge for boat sewage, Battery Park Marina bought turn-key docks in 1985, which included a diaphragm pumpout station on the fuel dock. The pumpout line

was hooked directly to the city sewers. Later that service expanded with the addition of a Keco portable toilet dump station in 1990, which cost \$400. In 1991 the main pumpout was replaced with a Johnny Trap progressing cavity-type pump system, which cost \$2,450.

"At first we charged everybody \$5.00 per pumpout, but in 1989 made it free for customers and \$5 for others," said Carl Wolf. "Over the years, the number of pumpouts increased dramatically as more and more boaters decided to not discharge overboard. Boat holding tanks range in size from 3 gallons, many with 20 gallons, up to 50-gallon capacity. We now range between 50 to 100 pumpouts per week in season. In 1995 we did over 1,000 pumpouts with an estimated 10,000 gallons of sewage going for treatment—not into the lake."

"The annual maintenance cost in 1995 was \$20 and generated an income of \$1,500 from other boats visiting our dock," Wolf added. The city charges Battery Park no extra fee for the added boat sewage.

"Most customers are willing to pump fuel, but not their sewage. Our dock staff do all the pumpouts and like the job. Boaters are so happy with our staffed service that they tip very well. Using that as an incentive to summer staff, I offer the pumpout station job only to the returning dock hand with the best work record from the previous year." Imagine getting pumped out by the best employee of the marina!

"Customers want one stop for both fuel and pumpout. Pumping out at fuel dock does increase our fuel sales volume an estimated 4% in 1995, or \$11,000 more," said Wolf. "Our policy about Y-valves is simple: no pumping over the side, period!"

In 1996 a second Johnny Trap pumpout station will be added to the fuel dock, which will cost \$6,000, including design, permit, and installation. That cost will be

Battery Park Marina has been nationally credited with helping demonstrate responsible environmental leadership in the marina industry.

*Portable toilet dump station at the fuel dock.
(photo by Battery Park Marina)*



subsidized with a \$4,350 CVA pumpout grant from the State of Ohio. Marina manager Philip Doller explained, "Our fuel dock is 15 feet wide by 150 feet long and we can service up to 20 boats on both sides. The second Johnny Trap will mean we can pump out every boat without having to relocate it near the original pump. On average it takes about 7 minutes to pump out and rinse a typical 20-gallon holding tank."

Other improvements and benefits

Lake Erie had become so polluted that 20 years ago it was widely called "a dead lake." Sandusky Harbor was once so dirty that "we could not see more than a foot deep into the water," said Wolf. "But by 1995 it had become clear enough for me to see 6 feet down to the bottom for the first time in my life." He credits the significantly improved clarity to three factors: widespread pollution abatement around the lake, clean marina practices, and zebra mussels (great filterers). Today both commercial

fishing and sportfishing are doing very well. Lake Erie is truly a national success story of pollution abatement.

Another Lake Erie environmental success story is Battery Park Marina. When the Pheiffers leased the property in 1984, the marina was in such bad repair that waterway guidebooks actually advised mariners to stay away. The marina was totally rebuilt with new docks and landscaping, and it reopened in 1986. It quickly became very popular and economically successful, and eventually spawned a number of other marinas on the bay.

"Being as open as we are in the public view, we decided to start cleaning things up and lead the way on the environmental front," said Wolf. "Every year, we try to make improvements and update our policies to protect the waterfront." Much of the clean marina success was the achievement of manager Carl Wolf. He worked with the Rhode Island-based International Marina Institute (IMI) to create a standardized marina operations manual for industry use, including the evolving best management practices.

Clean appearance has always been a top priority for Battery Park Marina management. "I make a point of insisting that all staff pick up any litter they see. If I am walking with one of them and see some paper on the ground, I rush to pick it up before the employee does. And if I get there first there is a mild reproach given. Believe me, with so many young dock staff, they keep me on my toes trying to keep the place clean. Our 'Rat Patrol' walks around the marina daily picking up floating debris with swimming pool nets," Wolf added.

"Oil spills are not a big problem at Battery Park Marina, where a large spill is about four tablespoons," stated Wolf. "We only had one spill like that in 1995, but we still immediately called the Coast Guard, as is our policy."

"Some of our other efforts toward environmentalism are oil pads on fuel dispensers, oil booms strategically placed in case of spills, grass clippings used for weed control, and a waste oil and used battery drop-off point," said Doller. "These are just a few of our efforts. For example, in 1994 we began to place an oil boom where the fuel line joins our floating dock, in case the connection leaks. It is also there to capture any liquids or debris that floats from either the east or west basins. The booms last about 6 months and cost \$25 each."

"In 1995 we started placing oil-absorbent pads on all of our fuel dispensers to try to reduce the amount of fuel spilling in the water during fueling of boats." Staff cut absorption pads (also called mats and diapers) into squares, then cut an X-shaped hole in the center for the fuel nozzle to pass through. Any backslash at the filler pipe gets absorbed instead of splashing on the deck, on a customer, or into the water. Doller explained, "We used about 55 pads last summer, with each lasting 1 to 2 weeks. The boaters like the pads and visually see the water is cleaner." With a bag of 100 mats costing \$88 from New Pig, Battery Park Marina spent about \$48 to prevent the common source of fuel spill in most

marinas—a very cost-effective practice.

"For several years we have offered a place to deposit used oil and batteries at no cost to the customer. The local battery company doesn't charge us for pickup, and the local oil company charges \$40 a season for pickups. Before we started recycling, the waste oil and batteries ended up in the trash receptacle and created a huge mess," said Wolf.

"Most of these environmental improvements are cost-generating for our marina. But cleanliness and safety are extremely important goals we strive for at Battery Park Marina," said Doller. "We hope this encourages customers to continue docking their boats at our facility." And it obviously has done that.

With the City of Sandusky their landlord, Battery Park Marina has always tried to cooperate with the city administrators and commissioners as much as possible. The marina runs a series of special public events, including a fishing derby for kids, a "Fishing Has No Boundaries" program for handicapped persons, two boat shows, and four concerts. "If we were not a clean marina, these events would not be here," Wolf stated. Apparently, this has worked because "the city uses photos of our marina in its downtown promotional efforts and seldom blocks our marina plans." Battery Park Marina has a fish-cleaning station available for customer use—a testimony to the improved fishery and water quality of Lake Erie.

Every year before the boating season begins, all marina employees participate in an in-service training program. Run by Wolf, it includes operational, emergency, and environmental basics. In addition, each employee has a written job description plus a copy of the marina's operational manual of practices. Everyone knows what is expected. And the positive and professional attitude of the staff encourages customers to keep the marina clean. Battery Park newsletters and signs educate boaters on proper disposal of garbage, recyclables, and

contaminants.

Because there are no boat maintenance services offered at Battery Park Marina, it has not needed an NPDES storm water permit.

Battery Park Marina decided to recycle its lawn clippings as a mulch around its many planting beds to help control weeds, add natural fertilizer, and help retain moisture. "The old way had been fine, but we can no longer take trimmings to the landfill," Wolf said. "As mulch, it looks a lot better than weeds."

"With the economy tight, customers are looking at price, but they are willing to pay a bit more at Battery Park because we are a clean marina." That proactive position earned industry-wide recognition when the marina was nominated for the National Marine Manufacturers Association's Environmental Responsibility Award for 1994, and received coverage in several national boating trade magazines and local newspapers.

Equipment sources

- Pumpout station, progressing cavity-type pump: Johnny Trap; Far Products, Inc., P.O. Box 561, Fremont, OH 43420-0561.
- Portable toilet dump station: Keco, Inc., P.O. Box 80308, San Diego, CA 92138.
- Oil absorption mats and spill boom: Pig Mats; New Pig, One Pork Avenue, P.O. Box 304, Tipton, PA 16684-0304.

4. Brewer's Cove Haven Marina

Metered Sewage Flow Saves Thousands

Location:	101 Narragansett Avenue, Barrington, Rhode Island 02806	
Telephone:	(401) 246-1600	Fax: (401) 246-0731
Interviewed:	J. Michael Keyworth, General Manager	
Owned by:	Cove Haven Corporation — Jack Brewer, Principal of the Brewer Boatyards chain in northeastern states	
Waterbody:	Bullocks Cove, in east shore of Narragansett Bay	

Environmental change

After adding a new pumpout station in 1994, a Doppler-type flow meter was installed on the marina's sewer line connecting into the town system, resulting in a lower annual sewer bill.

The full-service marina and boatyard

Well-landscaped and very clean, Brewer's Cove Haven Marina recently renovated its restrooms and showers to the delight of customers and the occupants of the 10 seasonal liveaboards. First built in 1961, Cove Haven was purchased in 1967 and became part of the 14-marina chain owned by Jack Brewer of New York. It is rated among the best marinas in Rhode Island.

Cove Haven is a full-service facility with a summer capacity for storing 220 boats in slips and 50 on land, while maintaining a full boatyard repair service for pleasure and commercial vessels. During a visit to the site, the author observed that a 105-foot U.S. Coast Guard cutter had been hauled with the 150-ton travel lift for major hull, propulsion, and interior work. The operation is so clean that no dust entered

the well-used swimming pool about 100 feet away.

Cove Haven remains one of the few yards specializing in the 12-meter America's Cup boats, and at one time maintained vessels from six different competing syndicates. The marina specializes in fine hull refinishing using the latest environmentally "friendly" high-volume, low-pressure (HVLV) sprays and dustless sanders. Other services include complete repair service to fiberglass hulls and inboard engines, metal fabrication, painting, sailboat rigging, canvas/sails, electronics, bottom cleaning, and keel installation. Much of the hull repair and painting is done inside several large storage and work buildings on site.

In addition to the slips and dry storage, Cove Haven is home to a yacht club, transient dockage, launch/haulout, used boat brokerage, marine store, fuel dock, and pool for customers. Other boat-hauling equipment includes a hydraulic trailer, a crane, and a forklift. Thirty-two employees work full-time year-round, with six part-timers added in the summer boating season. Boat sizes range from under 21 feet to well over 50 feet, with 66% in the 26- to 40-foot size range.

With 8 other marinas and boatyards and a combined fleet of nearly 2,000 boats within 2 miles of Cove Haven's docks, the marina is in a very competitive market. But as part of the Brewer Yacht Yards marina chain along the coast from New York to Maine, Cove Haven has made a concerted effort to become an environmentally compatible marina. "When we started to clean up the yard several years ago," Mike Keyworth explained, "our customers gave us many compliments. So we kept on cleaning up and making improvements. And they complimented us more and more, which made us feel good. The thing about this process is that once we started, the more we wanted to do."

As a result of many environmental improvements, Brewer's Cove Haven Marina recovered faster from the recent [1989-1993] recession. Its slips nearly sold out, and the marina still charges berth rates among the highest in its market.

No stranger to environmental regulations, Mike Keyworth was one of a number who at first wanted to fight the proposed Coastal Zone Act Reauthorization Amendment (CZARA) program nonpoint source requirements back in 1991, but instead became involved in recommending changes to make the process work for both the environment and the marina industry.

Becoming an environmental activist, first as the Marina Chairman and currently as President of the Rhode Island Marine Trades Association, Keyworth has devoted hundreds of hours to making Rhode Island's coastal and environmental regulations more realistic

for the government and for the boating industry, the state's largest maritime industry.

In a recent statewide marina workshop, Keyworth said, "Even if Congress modifies the Clean Water Act, the nonpoint source guidance is what we should be doing

because it's the right thing to do for the environment. And it is also good for our boating business."

Management measures

Brewer's Cove Haven Marina achieves the marina management measures for sewage facility and maintenance of sewage facilities, as well as shoreline stabilization, storm water runoff control, fueling station design, solid waste, liquid materials, petroleum control, and public education.

Costs/benefits

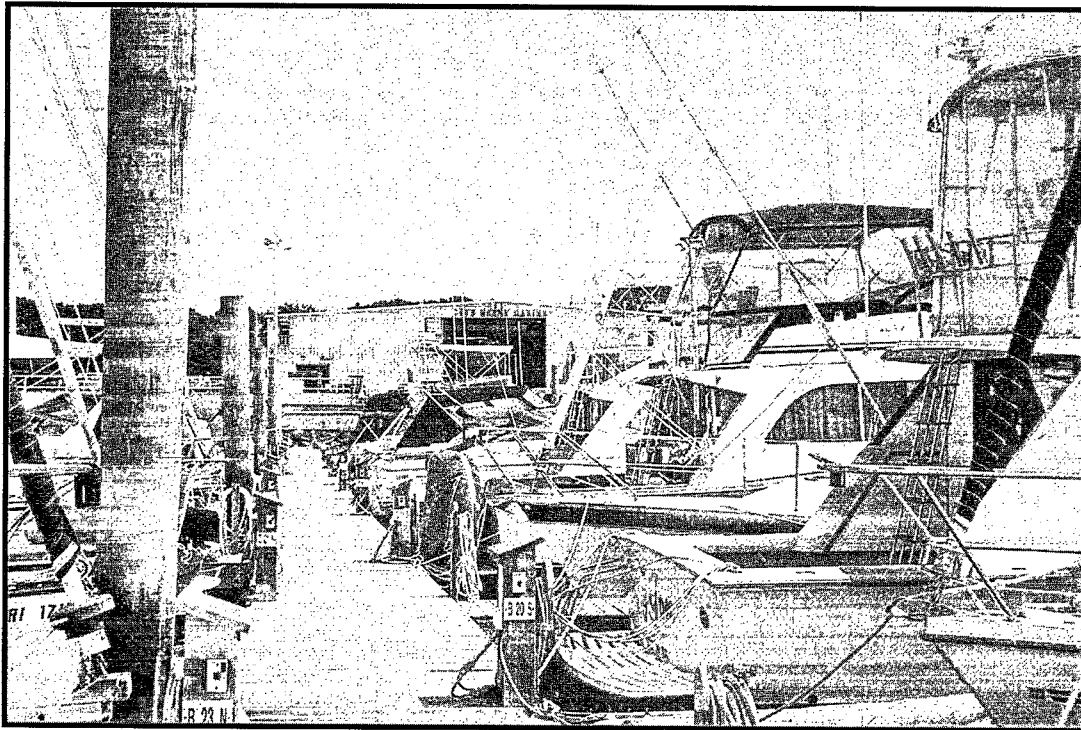
Cove Haven's town sewer bill decreased from \$3,410 in 1994 to \$807 in 1995 after installation of a sewage flow meter. Annual savings are expected to continue, and possibly increase, due to the rising cost of town sewer fees. The sewage flow meter and manhole were installed at Brewer's Cove Haven Marina for a cost of \$6,800.

Environmental improvements

Doing the right thing is not always as easy as it looks or should be. In this case, Brewer's Cove Haven Marina applied for and received a Clean Vessel Act (CVA) grant through the State of Rhode Island to install a two-station pumpout system with direct connection into the Town of Barrington's sewer line.

Once the grant had been approved, Mike Keyworth applied for a local permit to expand his sewer connection with the new boat pumpout. But, since the town sends all its sewage to the plant in the neighboring City of East Providence, it is bound by their regulations. Apparently an ordinance exists to prohibit septic haulers from loading their plant with waste from towns other than Barrington. Once the East Providence authorities learned of the approved pumpout station, they asked whether all the boats that could use it were from either East Providence or Barrington. Keyworth replied honestly that the boaters

"The nonpoint source guidance is what we should be doing because it's the right thing to do for the environment. And it is also good for our boating business."



Brewer's Cove Haven Marina accommodates 220 power and sail boats. (All photos by Neil Ross unless otherwise noted.)

came from many towns and several states and included frequent transient visitors from greater distances along the Atlantic Coast. On that basis, East Providence denied Cove Haven's request to tie in. After months of discussions, and with help from the Rhode Island Department of Environmental Management, the city realized how important it was to help clean the bay and modified its ordinance to exempt boat sewage from that restriction. That done, Cove Haven was permitted to tie in.

However, the East Providence officials estimated that the new pumpouts would significantly increase the sewage flow from the marina and projected a major increase in the annual sewage bill. Keyworth argued that the volume of boat sewage effluent would be relatively small and limited to the boating season (almost all from May through September). He further explained that since the normal sewer bill was based on the volume of town water purchased, even with the pumpout included, the marina's sewer volume would be less than that currently charged. A large percentage of the water used in this full-service marina

was used outdoors, mostly to hose down boats in slips, as well as to keep Cove Haven's swimming pool full and to water plantings. East Providence challenged Cove Haven to either prove exactly what the sewer volume would be or accept the city's higher cost estimate.

With the town engineer's approval, a low-volume sewage flow meter and manhole were installed to measure 100% of the marina's sewage output. The cost of that installation was \$6,800. In a very smart move, Keyworth insisted that the meter measure the entire marina, not just the pumpout station as the town had first suggested.

Once the pumpout stations and meter were installed, the town began to read the meter every month. Based on the readings, i.e., actual marina sewage flow volumes, the 1995 sewer bill decreased by a total of \$2,603. The overall cost to construct and install the sewage flow meter and manhole was \$6,800 in 1994. Based on cost saving alone due to the metering, this cost would be paid off in 2.3 years. However, the installation cost of the flow meter was

covered in the marinas's CVA grant for the pumpout station with the 25% match contributed by the Rhode Island Department of Environmental Management.

Other marinas with sewer bills based on the volume of city water purchased should consider installing a flow meter, Keyworth recommends. The actual sewage volume produced will almost always be much less than the amount of water used, and savings can result.

Other improvements at Cove Haven include oil spill containment equipment stored at the fuel dock, dustless sanding, recycling of used oil and solvents, public education through newsletters and signs, designated hull work areas, and major renovation of restrooms and showers.

Other benefits

Slip customers at Cove Haven, like others with slips in the five-state Brewer chain, receive a credit-card size magnetic card to operate the do-it-yourself pumpout station free. There is a refundable \$50 deposit for the card, which allows all free pumpouts in any one or all 15 marinas in the coastal chain. Non-slip customers pay \$5.00 per pumpout.

By offering pumpout service to all the boats in Bullocks Cove, "that which is pumped out is not pumped out into the waters of the bay," Keyworth said. "Our boaters receive a clear message that we are doing the environmental right thing, and they should do it as well."

The town benefited when inappropriate local sewage regulations were modified to accommodate changing times and standards. Rhode Island was able to further accomplish its goal toward cleaner waters, which is good for the public. The national Clean Vessel Act's goals, enacted by Congress, were accomplished here. And in the process, metering our line obviously saves money on sewer bills."

Brewer's Cove Haven Marina is thus saving a significant annual cost after

challenging and proving that its annual sewage production—from a 220-slip full-service marina with two pumpout stations—was much lower than previously estimated and billed in past years. The main benefit of this project—for the people of East Providence, Barrington, and Rhode Island—is that Cove Haven Marina (and the three other Brewer yacht yards around Narragansett Bay) is helping to improve the water quality. Mike Keyworth added, "We need clean water for people to have good boating on the bay."

"We add an environmental surcharge of 1% on everything—slips, haulout, labor, services, materials—as do the other full-service marinas in our Brewer chain (although the rate may vary between yards)," Kenworth said. "We only had one or two complaints at first. Now everyone accepts it as part of their contribution in the effort to clean up the waters of our bay." Income from the surcharge has helped pay for Mike's time attending environmental planning meetings with government professionals, as well as obtaining an NPDES permit, developing a BMP plan, training staff, cleaning up the yard, posting signs, and other unbillable costs necessary to maintain a clean marina.

Equipment sources

- Sewage meter: An echo ranging, ultrasonic flow meter used in conjunction with a primary measuring weir device for fluid flow in an open channel. Mounted above the weir, the transponder works by measuring the changing distance from the meter to the surface of the liquid passing the weir neck. Polysonics ERS91-F, open-channel flow meter, by Peek Measurement, Houston, TX.
- Pumpout station and magnetic card: Waubashene ARV 125-gallon; Waubashene Machine and Welding, P.O. Box 99, 111 Coldwater Road, Waubashene, Ontario, Canada.

5. Cap Sante Boat Haven

Recycling Program Means Big Savings for Town Marina

Location:	11th and Q Avenue, P.O. Box 297, Anacortes, WA 98221	
Telephone:	(360) 293-0694	Fax: (360) 299-0998
Interviewed:	Dale Fowler, Harbormaster	
Owned by:	Port of Anacortes	
Waterbody:	Fidalgo Bay, Strait of Juan de Fuca	

Environmental change

Public education and a free recycling program lead to cleaner water, cost saving, and pleased customers at this large public saltwater marina.

The large public marina

Cap Sante Boat Haven is a publicly owned and operated facility located in the heart of the Town of Anacortes. The marina has 1,150 slips for boats from 17 to 100 feet LOA, with the average vessel at 36 feet. It was 100% occupied in 1995 and is "always full with a waiting list for permanent moorage," wrote Jeanine Keller, a staff member at Cap Sante. "Sailboats occupy 40% of our slips with the remaining 60% powerboats."

The marina operates year-round as both a home port and a major destination harbor. During the boating season there are 18 full-time employees, 8 of whom work year-round. On a typical weekend, during the June through September summer season, there were 100 to 200 transient boats visiting with most staying overnight. A total of 12,000 transient boat nights were logged in 1995. There are no liveaboard boats.

Two pumpouts, four restrooms/showers, and two laundromats are available in the

marina. The U.S. Coast Guard has a dock and office in the marina. Another section of the marina provides moorage for up to 150 commercial fishing boats.

Next to the municipal marina is the commercial boatyard, Cap Sante Marine, Ltd., which leases land from the Port of Anacortes. The yard has full boat repairs, hauling, storage, boat sales, engine warranty work, and ship's store available. That's where many of the marina's customers get work done, including bottom cleaning.

Within a 2-mile radius are 4 other marina facilities, all serving almost 3,000 boats in the area. The Boat Haven was started in 1926 as a fishing moorage facility in a light commercial ship building and fishing port. The current marina was expanded by 500 slips and upgraded in 1984.

Management measures

Cap Sante marina achieves the marina management measures for solid waste and liquid materials, as well as marina flushing, shoreline stabilization, storm water runoff control, sewage facility, maintenance of sewage facilities, petroleum control, and public education.

Costs/benefits

Cap Sante Boat Haven has a free waste recycling program, which cost the marina \$1,200 in 1995, but eliminated \$12,000 in waste disposal costs, for a net saving of \$10,800.

Environmental improvements

Cap Sante Boat Haven initiated its comprehensive recycling program in 1991. As part of an aggressive community program, the marina collects and recycles cans, glass, paper, waste oil, antifreeze, cardboard, plastic, wood, and flashlight batteries—all free to customers. In the commercial fishing section, recycling also includes fishnet and bulk metals.

"We have seen a cleaner environment with much less litter in the water. With this waste stream diverted to proper disposal, we find this promotes boater compliance with other environmental regulations. Since our facility is open to the public, our neatness pleases customers and the community," said Dale Fowler. "Even though the recycling service is free to customers, it still saves our marina money by cutting down

"Even though the recycling service is free to customers, it still saves our marina money by cutting down on the amount of trash we pay to have hauled away."

on the amount of trash we pay to have hauled away. Our waste stream cost was approaching \$80,000 annually."

"Anacortes has a waste management program townwide and we partici-

pate. We rent 28 recycling bins (separate for glass, paper/cardboard, plastics) and place them at each of our 8 dock heads to make them easy to use. To get to the dumpsters, people must walk past the recycle bins; they feel guilty if they don't recycle.

In 1995, "It cost us over \$60,000 in trash removal, while we saved \$12,000. Each year we easily pull out 10% to 20% for recycling, yielding savings of \$6,000 to \$15,000 annually. We pay the town \$1,200 rent for the bins, so the savings are obvious."

"Many people help us by recycling, but there are a surprising large number who just won't take the time to recycle. They dump everything in the trash—and that is much more costly."

"Our whole Skagit County currently has recycling available. We have to pay to dispose of waste one way or another, so we recycle as much as possible. Another example is getting rid of the commercial boat waste. It cost \$8,000 previously, but now less because some of the used commercial fishnet is recycled into landscaping and tennis court nets (for a real net saving!). Recycling is becoming a way of life here."

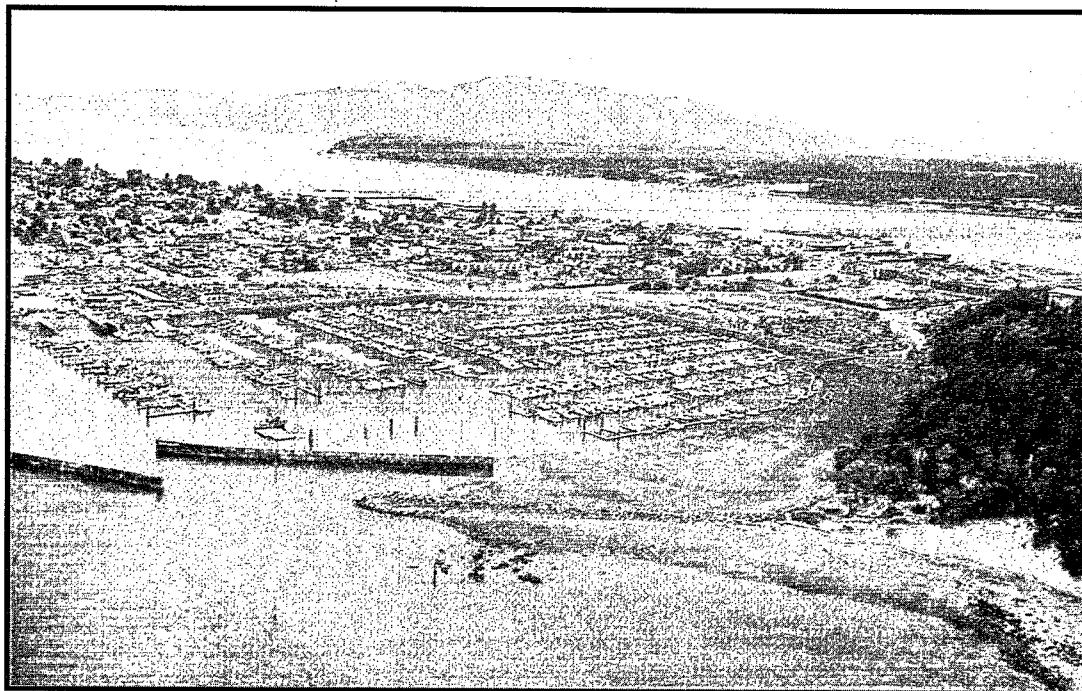
A unique form of recycling organized by Cap Sante Boat Haven is its materials exchange program, which encourages sharing leftover products like varnish instead of tossing them away. As the marina's newsletter explains,

In the harbormaster's office you can use our materials exchange sheet. Simply list your name, telephone number, and a brief description of the product you have an excess of. You will give a fellow boater the chance to get more life out of a product, rather than disposing of it. All products must have original labels in place.

Other improvements and benefits

"Cap Sante Boat Haven is widely known as the best marina along this part of the coast—for our restrooms, layout, clean water and grounds. People come back because they like it here. We estimate that 25% of our transient customers' good impression of the marina is based on our clean water," said Fowler. "Gross transient income was \$150,000, but if we weren't a clean marina our estimated total would be much less."

"All our storm drains are stenciled 'Dump no waste - drains to Bay' with pictures of crabs and fish. This proactive approach pays off in attracting customers.



Municipal Cap Sante Boat Haven, on Washington's Strait of Juan de Fuca. (photo by Cap Sante Boat Haven)

We are 100% full with 4-year waiting lists, so we know clean environment is important."

Two pumpout stations, one fixed and the other mobile, and two portable toilet dump stations are available free for boater use. "We removed the fee to encourage use of pumpouts. Also, in our rules and regulations we made our marina a no-discharge facility even though the bay is not a federally approved no-discharge area yet. Our 30-gallon mobile 'Honey Wagon' pumpout is on a cart. About half the people who use the mobile unit bring the cart to their boat but, surprisingly, others find it more convenient to take their boat to the cart. In 1995, we collected over 5,000 gallons of sewage, which went directly into the town sewer system for treatment."

"We had the use of a prototype pumpout barge for one year, and it worked so well we will buy one in 1996," explained Fowler. "The barge system offered us the highest flexibility and ease of use for the customer. The barge will be anchored between two piles at the mouth of the

harbor to make it convenient and easy to use. A self-serve pumpout and our second dump station will be on it. We applied for a CVA \$30,000 pumpout grant through the state, and hope to have the barge in service by June 1996," said Fowler. "It will have a 3,500-gallon capacity and should need emptying twice a year."

The Cap Sante Boat Haven is prepared for oil spills with absorption booms and pads. "Numerous 30-foot to 100-foot sorbent-type 6-inch-diameter booms are strategically anchored cross current to capture any drifting oil. There is very good tidal flushing and we change those floating booms twice a year. As for oil spills, we deployed another boom only two times in 1995," Fowler reported. "We are considering replacing the absorbent spill boom in 1996 by buying 700 feet of containment boom to control spills, then using pads to absorb the fuel. Then we can estimate the amount of spillage by the number of pads used. This will make billing customers for cleanup easier. The new boom will cost about \$9.00 per foot and should last 10

years. The absorption pads are cheap—about \$0.25 each. We use about 800 pads per year (4 bales of 200 each), at a cost of \$50 per bale, or \$200 per year.”

“We encourage all boats to have oil absorption pads in their bilges,” Fowler stated, “and it really helps keep the water cleaner. Most of the oil spilled in the harbor comes out through the bilge. The largest spill we’ve had was under 12 gallons and came out of a power boat after the transfer pump was left on and overfilled one tank. But the most common spills are very small. We also get spills in the summer from thermal expansion squirting fuel out the air vent.”

This marina received a Washington State NPDES storm water permit. However, there is some question whether it is required. The Port of Anacortes is not a commercial business, the marina does not do boat maintenance or cleaning, and the marina does not have a SIC number, nor does the town’s population reach the 100,000 threshold above which a storm water permit would be required. “We control runoff from our paved parking lots with vegetated buffers—grassy swales which act as bio-filters. All our storm drains have oil/water separators. Catching the pollutants before they get into the bay has made a big difference improving marina water quality. Each dock head also has signs urging boaters not to throw trash overboard and to use the waste oil collection centers.”

The neighboring boatyard tenant has a storm water permit, as is required of commercial boat-servicing businesses. Pressure washing is done there, but the waste water goes through traps and filters at that yard in compliance with Washington’s storm water permit regulations.

Harbormaster Dale Fowler is the past president of the Pacific Coast Congress of Harbormasters, where he has actively been promoting clean marina practices. “Marina customers have a very strong sense of ownership in their marina. They like to see

a clean marina attitude because this is where they come for recreation. It’s like their backyard, and they are quick to point out any mess. By identifying small problems, boaters help us stop them before they become big ones. Keeping a clean marina helps our customers feel good about their marina and us.”

“In the Pacific Coast Congress, we spend a lot of time on environmental issues as our consistent theme. Pollution and cleanup impact us [harbormasters] all in financial and legal ways. As a concept, we can make the very best out of environmental improvements by doing things in a proactive manner. Hopefully we can avoid problems, because we strive for a higher level of customer service and quality of life. This is one of those places where an ounce of prevention is worth a pound of cure.”

Equipment sources

- Mobile pumpout: Honey Wagon portable pumpout system; Northwest Yacht Brokers Association, 2442 Northwest Market, #321, Seattle, WA 98107.
- Stationary pumpout: Keco, Inc., P.O. Box 80308, San Diego, CA 92138.
- Portable toilet dump station: Keco, Inc.

6. Cedar Island Marina, Inc.

Marina Habitat Assessment and Scallop Farming

Location: Riverside Drive, P.O. Box 181, Clinton, Connecticut 06413
Telephone: (860) 669-8681 **Fax:** (860) 669-4157
Interviewed: Jeffrey Shapiro, President
Owned by: Shapiro Family Trusts
Waterbody: Clinton Harbor, Long Island Sound

Environmental change

Ten years of private ecology research has demonstrated that recreational boat full-service marinas are productive artificial reefs and has led to the development of commercially viable bay scallop aquaculture under marina docks.

The full-service marina, boatyard, and fish farm

Cedar Island Marina is a family-owned business that calls itself "the family boating resort." It is a full-service marina/boatyard with 400 slips operating at 94% capacity in 1995, with many transient visitors filling slips vacated when homeport vessels are away. Three boats are year-round liveaboards. Boat sizes range from under 21 feet up to 120 feet, with 76% between 21 and 35 feet, and 19% longer; 35% are sailboats.

Cedar Island has a staff of 25 year-round employees, which expands to 50 full-timers during the boating season. In addition to slips, the marina has retail services: ship's store, grocery, ice, bait/tackle, used boat brokerage, fuel dock, and pumpout. Launch/haulout is available with a 30-ton travel lift and "giraffe" crane for indoor and outdoor winter boat storage. Full repair

services include fiberglass, hull, and engine repair; painting; sail rigging; sail making; welding/metal fabrication; and bottom cleaning.

Located in Clinton Harbor, one of the few protected harbors (in southern New England) not burdened with industry, the resort-like marina is 1 mile from the entrance buoy to Long Island Sound and borders the Hammonasset Nature Preserve. Its customer amenities include a laundry, 60-foot swimming pool, sauna, whirlpool, picnic grounds, saltwater beach, snack bar, 275-seat restaurant, poolside bands, night security, cable TV, and a children's activity director. On a busy summer weekend approximately 40% of the boats are in use, occupied, or under way out of the harbor; about 20% of the boats have people sleeping overnight.

Within a 2-mile radius, there are 8 other marinas and boatyards with an estimated total boat population of 2,000. The prime boating season starts in May and ends in October. Cedar Island Marina was bought by the Shapiro family in 1974 and converted from a fuel terminal built in 1964. Jeffrey Shapiro is also a general partner in the Clinton Harbor Boat Show each July—another major focus of attention, publicity, and potential customer draw to his marina.

Management measures

Cedar Island Marina achieves the marina management measures for water quality assessment and habitat assessment, as well as marina flushing, shoreline stabilization, storm water runoff control, fueling station design, sewage facility, sewage facility maintenance, solid waste, liquid materials, petroleum control, and public education.

Costs/benefits

In 1995, Cedar Island Marina spent \$38,500 to staff and operate its private marina research laboratory, including two full-time marine biologists. Its aquaculture project and public display aquariums attracted new boating families into slips for the season and helped retain other customers, resulting in an estimated \$46,000 gross slip income. The special docks designed by Cedar Island for the aquaculture project cost the company no more than conventional docks. Marina management estimates that the aquaculture project brings them around \$5,000 worth of publicity each year and has extended their dredging season, saving another \$5,000 annually.

Environmental improvements

When the State of Connecticut turned down Cedar Island Marina's request for an additional 396 slips in 1988 because the expansion would be "destroying valuable marina life and habitat," little did anyone

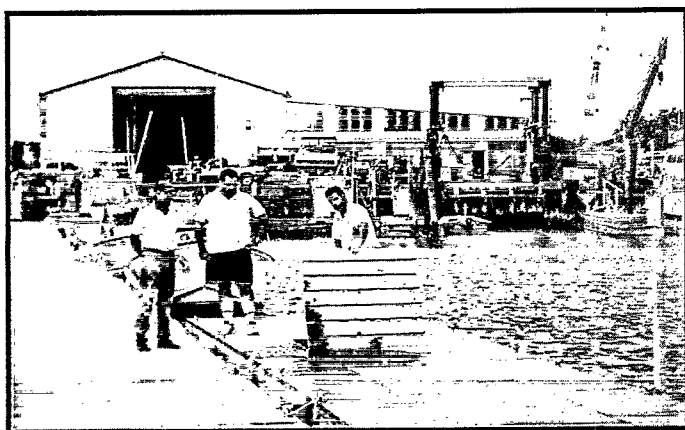
realize what positive effects would result after Jeffrey Shapiro accepted the challenge. "We decided to prove Connecticut wrong because I was convinced that the marina would improve—not destroy—the harbor's habitat. So I began hiring environmental consultants to test what was happening in and under the marina waters here." That effort has turned into a full-time marina ecology research laboratory with two full-time scientists. Thirteen technical reports were published and/or presented at professional estuarine, fisheries management, and Long Island Sound conferences between 1989 and 1995.

The Cedar Island Marine Research Laboratory is entirely owned, operated, and funded as part of Cedar Island Marina. Its laboratory and in-water field station are also in the marina. Studies have included assessment and long-term monitoring of water quality (temperature, salinity, dissolved oxygen), marina habitat, coastal birds, and finfish communities (particularly juvenile winter flounder, *Pseudopleuronectes americanus*) in the marina, as compared to other natural habitats in Clinton Harbor.

"Testing has proven that our marina's waters have good oxygen levels and lower coliform counts than those at the town beach. And heavy metals did not accumulate in scallops growing on the marina bottom," Jeffrey Shapiro stated. "Also the periwinkle snails—a favorite food of winter flounder—are 20 times more abundant on the marina's dredged bottom than on the neighboring mud flats, which helps explain why we have a 10-times larger population of baby flounder under our docks than elsewhere in the harbor."

Studies in recent years—performed in cooperation with the marine laboratories of the U.S. Fish and Wildlife Service, Connecticut Department of Environmental Protection (DEP), and Connecticut Sea Grant—have focused on the marina habitat with special emphasis on its finfish nursery and shellfish aquaculture potential.

With removable center panels, marine biologists check the growth of scallops in traps suspended below the Cedar Island Marina's floating docks.



Noticing that many marine species grew more rapidly and remained healthy under marina docks and boats, Shapiro's lab staff started growing shellfish on trays suspended below the floating docks. Indeed, they grew faster than those placed in neighboring natural marsh flats and were just as safe for human consumption.

Oysters, it was determined, could be grown to market size 1 year quicker under boat docks than outside the marina basin. (Note: Cedar Island's research under marina docks is consistent with that done by others on hard-shell clams in Rhode Island and finfish in Washington.)

But two key factors inhibited use of marinas for oyster farming. First, U.S. Food and Drug Administration standards require the filter-feeding oysters to be relocated to "clean" waters for several months of depuration before being eaten, and that extra handling is costly. Second, oysters take 4 years to grow to market size. Shapiro switched to another shellfish—bay scallops—and seems to have solved those problems.

In the spring of 1995, with some Connecticut Sea Grant funds and in-kind technical help from state and federal marine biologists, Cedar Island Marine Research Laboratory bought 6,000 baby bay scallops, each about the diameter of a pencil (measured as 1,000 per liter). The scallops were distributed inside plastic mesh bags placed into three-level wire cages hung beneath special 60-ft floating aquaculture docks designed and built by Cedar Island Marina. Deck trap doors open to allow access to each shellfish cage for easy removal. Every 4 weeks, each cage is pulled. The mesh bags are opened, and the scallops are counted, measured, lightly brushed to remove fouling growth, and separated into more bags, but with fewer scallops per bag to allow expanded growing space.

By late September, all the scallops had grown to market size averaging 3 inches each. Asked what the mortality rate had been, research manager Matthew Mroczka

answered, "I expected about a 30% death rate, but so far have lost 4—not percent—only 4 scallops, leaving 5,996 still alive and growing!" Aquaculture typically has higher survival rates than those in nature, often because of protection from predators, but Cedar Island's demonstration is truly remarkable.

"Now for the good part of why scallops are better than oysters here," said Shapiro. "When most shellfish are eaten, we consume all the meat and stomach, including whatever the animal's last meals included. But we only eat the large muscle of the scallop with the stomach thrown away. So the concerns about water quality do not apply the same way for scallops. Second, the scallop lives only one year from seed to maturity. So producing shellfish for market is largely done during one boating season."

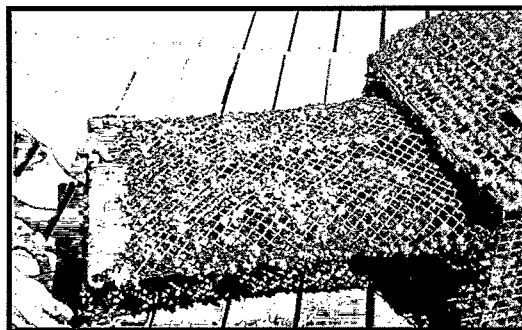
"Today, each 3-inch scallop retails at 50¢, so if we sold this year's crop, we would gross \$3,000. However, because the seed, costing \$72, was paid for with a federal grant, we will turn them over to the University of Connecticut. But we will keep some of the biggest ones (which grew fastest) to become our breeding stock for 1996. And we will expand the number of scallops and cages. We are happy with it," Shapiro said. "Next year we're going to make money on it in a business way. And each year we'll select our fastest-growing scallops as breeders for the next generation, much as farmers select their best seed and animals for breeding."

"For 30 years there has been no commercial scallop fishery in the state. But within specially designed docks at Cedar Island Marina could be the seeds of a reborn commercial fishery."—The Hartford Courant, September 23, 1995.

Other benefits

Another clear business benefit derived from the lab work is that Cedar Island Marina is permitted to do its annual dredging, to maintain -8 feet MLW, during non-winter months. (All other marinas on Long

Aquaculture wire mesh traps protect scallop seed from predators and hold multi-levels of trays.



Island Sound are limited to dredging in bitter cold months.) "Our environmental database, particularly the juvenile winter flounder data, helped convinced the state to extend our marina maintenance dredging season beyond the February 1 deadline to June 1, which gives a \$5,000 cost saving by spot dredging in warmer weather."

This unusual marine research laboratory, owned and operated by a private commercial full-service marina, is unique in the world. Shapiro admits that it is unlikely that most other marinas could afford such a sustained scientific effort. "I learned that it was more cost-effective to hire full-time biologists rather than hiring consultants at

\$100 per hour. We've been spending over \$30,000 annually for 5 to 6 years, and are now only really starting to see a [business] return." But the Cedar Island Marine Research Laboratory's published reports will benefit the

entire marina industry internationally for many years.

To demonstrate the marine life diversity in the boating facility, the lab staff stocks and maintains a 400-gallon saltwater aquarium in the marina office. It is a major attraction for children and parents. "Many boats arrive for fuel and pumpout at Cedar Island's dock just so the kids can run to the office to see the aquarium with all that stuff living under their docks," Shapiro said proudly. "We set up a large marine touch

tank during the Clinton Harbor Boat Show in late July. There were 5,000 people visiting the show, and our tank was the biggest attraction in the exhibit. It really impacts boater behavior not to throw trash or oil overboard. It also attracts visitors who heard about our aquarium. We get a chance to educate people about our environment."

"We got a \$3,000 pumpout grant to add a second portable pump and 250-gallon holding tank for our fuel dock," Shapiro said. "We use a large 3-inch-diameter diaphragm pump and hose to give us greater suction and faster speed. We charge \$5.00 for a pumpout done by our dockhands, but it is free for our slip renters. As a staff incentive, at the end of the season each year I recognize the staff member who did the most pumpouts with a personalized 'Pumpout King Award' and his/her name added to the plaque hanging in the fuel dock office. I started this in 1989 at the suggestion of two dock boys who were competing to get the most pumpouts that summer. The winner that year is listed first, then the other returned in 1990 determined to win—and he did—so his name is second. They like the competition." Asking every boat at the fuel dock to have a pumpout is part of the staff's written job description.

Also at the fuel dock, "An oil absorption boom, attached to a painter extension pole, lays on one end of the dock. Whenever a small spill occurs during fueling, the dockhand grabs the pole and pulls the 30-foot boom over the petroleum and moves it around until all the spill is absorbed, much like a mop would."

Waste oil and batteries are collected at the service area for recycling. This gives people a convenient place to bring their used oil, instead of throwing it into the dumpster or on the ground.

Gravel permeable parking and work areas help control runoff pollution. Landscaping in the public areas around the stores, pool, and restaurant makes a nice, clean marina atmosphere for boaters.

"Many boats arrive for fuel and pumpout at Cedar Island's dock just so the kids can run to the office to see the aquarium with all that stuff living under their docks."

7. Conanicut Marine Services, Inc.

Marina's Inland Boatyard/Storage Reduces Environmental Risks and Costs

Location: One Ferry Wharf, Jamestown, Rhode Island 02835
Telephone: (401) 423-1556 **Fax:** (401) 423-7152
Interviewed: William Munger, President
Owned by: Marilyn and William Munger
Waterbody: East Passage, Narragansett Bay

Environmental change

Off-site boat repair and storage at two inland sites avoids potential environmental harm to the bay at this downtown marina and mooring basin.

The full-service marina

Conanicut Marine Services, located at the site of the former Newport-Jamestown ferry terminal, continues maritime industry use of the shore that started in 1675. The Mungers built the East Ferry Marina in 1974 in the old ferry basin and pier under a lease from Jamestown. The marina was expanded and doubled in 1995 with the addition of Conanicut Marina, also owned by the Mungers. It has more than 1,200 feet of fixed pier dockage and wet storage capacity for 305 boats (100 slips and 205 moorings), with a minimum 10-foot water depth. Of these, 48 slips and 20 moorings are held open for transient boat visits, so important to the local economy. During the 1995 boating season, the marina was sold out of seasonal slips and 90% of its moorings. The largest boat it can accommodate

in a slip is 200 feet, with the average ranging from 28 to 30 feet LOA. The boats are split with 80% sailboats and 20% powerboats—about the opposite of most other marinas in the state. A public dinghy dock is provided for boats kept on moorings.

In addition to the slips, moorings, and transient dockage, Conanicut Marina offers an on-site fuel dock (gasoline and diesel), Conanicut Store, electronic sale/service, free pumpout, ice sales, launching/haulout, mast stepping, sail rigging repair, bottom cleaning, and used boat brokerage. Free slips are provided for the town boats of the harbor master and fire department. A 20-ton and a 12-ton crane do most of the sailboat rigging and small boat launching off the marina pier. The marina's shore is a town park and public parking lot. Several fine restaurants, shops, and hotels are close to the docks.

While the dockage is seasonal, mostly between May 1 and mid-October, Conanicut Marina is a year-round, full-service marina with off-site, non-waterfront boat repair and dry storage. Twenty profes-

sionals are employed year-round, and an additional 10 work during the summer boating season. Boats are repaired at the Conanicut Marine Valley Street Shop, about 0.5 mile inland to the west of the marina. Services provided inside the heated shop buildings include fiberglass, painting, and engine repairs. The main Conanicut Marine Services office is located over the ship's store at the marina.

Conanicut Marine Services' Taylor Point Yard is an 11-acre boat storage yard, added in 1985. It is located 0.75 mile inland north of the marina basin. Over 30 boats up to 45 feet are dry-stored in two large sheds, with 150 more outside on cradles or trailers. Bottom painting, winterization, oil changes, and rigging repairs are done at the storage yard. To move the boats between the marina, shop, and yard, the marina has two submersible-type hydraulic trailers. The hot-dipped, galvanized trailers use a town ramp adjacent to the marina, while the cranes operate off a solid pier in the facility. The trailers added a new profit center, boat delivery service to homes across the state.

During a peak summer weekend, typically about 30% (approximately 80) of the boats in Conanicut Marina are used by customers. About 20% (or 50 boats) are used for sleepovers. Restrooms and showers, as with pumpouts, are free to customers. There are no liveaboards in the marina.

Within a 2-mile radius of the facility are three other marinas and boatyards, plus one yacht club. All five (including Conanicut) serve a boat population estimated at more than 1,000. During the 1995 season, Conanicut Marina began offering ferry service to and from Newport, reinstituting shuttle service between Narragansett Bay's two largest islands. After 300 years of operation, the service had been suspended in 1969 when the Newport Bridge opened.

Conanicut Marine Services is Jamestown's second-largest private employer with 22 full-time workers.

Management measures

Conanicut Marine Services achieves the marina management measure for storm water runoff control, as well as the measures for marina flushing, shoreline stabilization, sewage facility, sewage facility maintenance, solid waste, liquid materials, petroleum control, boat cleaning, and public education.

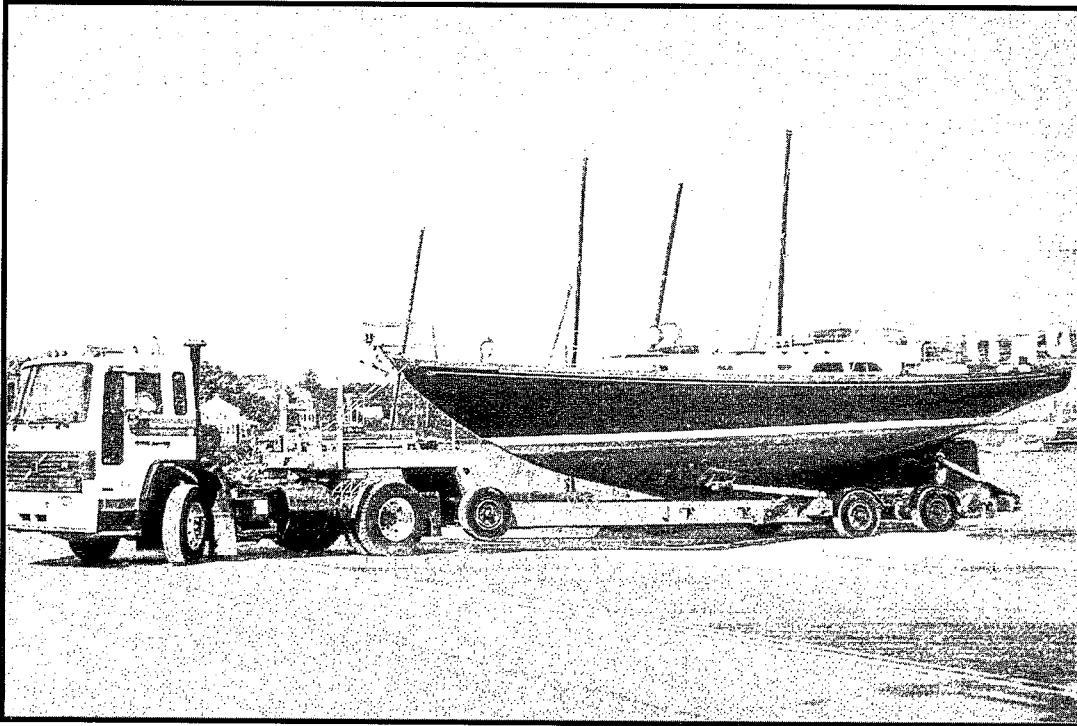
Costs/benefits

When Conanicut Marine Services bought its boatyard site in 1985, it saved an estimated \$1,850,000 by buying 10 acres of land inland and another \$20,000 by not needing coastal permits. In 1995 it paid \$55,896 less property tax than it would have paid if the 10 acres had been located on coastal land. Although no shoreland property was available at the time Conanicut was purchasing the boatyard land, the price differential demonstrated the savings that are possible by shifting repair and storage away from the coast. Moving inland cost an additional \$63,000—\$25,000 to buy over-road hydraulic trailers (instead of yard-only boat-moving equipment) and \$38,000 for a truck that would not have been needed for a waterfront boatyard. Hauling boats to the inland site cost an extra \$6,768 in labor in 1995, but generated a new business of hauling boats to and from backyards, worth \$75,000 annually.

Environmental improvements

The major clean marina benefits of Conanicut Marine Services locating its boatyard and repair services inland include the following:

1. Inland land costs much less than coastal land. "We decided we needed space to repair boats, and all the usable waterfront was gone," said Munger. "The only space I could find and afford was inland." In 1985 the Mungers purchased the inland yard



Boats are hauled by truck and hydraulic boat trailer for repair and storage at Conanicut Marine Services' inland boatyard.

at Taylor Point at a cost of \$15,000 per acre. Back then the typical selling price for undeveloped waterfront land in Jamestown was \$200,000 per acre, or 13 times more expensive. In 1995, the marina bought an additional acre for \$20,000 to allow for yard expansion.

We had to purchase a truck and hydraulic trailers legal for highway use. Those cost about \$63,000 more than what the business would have spent for yard-only equipment. It does take extra time to move 180 boats between the marina ramp, shop, and yard. I estimate an additional 144 hours of labor this year costing \$6,768 extra, for an average \$38 extra per boat."

Munger added, "Actually, having to buy over-road equipment was a blessing in disguise because we are now a licensed and insured boat hauler, which brought in another \$75,000 just in 1995."

"There is no way we could have afforded to buy 10 waterfront acres (even if available) for the boatyard either in 1985 or 1995. But we really needed to add service work to maintain a core of key personnel. By 1995 the boatyard generated \$875,000 in service work."

2. Because of the lower per-acre value inland, the boatyard saves on annual town property taxes. In 1994, the marina's small shore land was valued by the town at \$430,400 per acre, whereas the yard's 10 inland acres were valued at \$34,000 per acre. If just the storage yard were on the waterfront—as is the case for nearly all other boatyards—Conanicut Marina would have paid \$62,709 versus \$6,813 in property tax; instead the marina saved \$55,896 in 1995.

Again, any tax saving on inland property is speculative and is estimated here only to demonstrate the economic benefits of the environ-

mentally sound practice of inland boat storage and repairs.

3. No coastal permits are needed for changes for either the inland Valley Street Shop or Taylor Point Yard. "When we put up a storage shed, we only get a town building permit. But when our waterfront also needed work, it took 6 years to get the coastal permits. Our shortest time for a coastal permit was 1 year. However, Rhode Island's new marina perimeter permit program shortens maintenance work permits to about 1 month."

The storage yard did not need either U.S. Army Corps of Engineers or Rhode Island coastal permits to be built. But based on cost and time needed for his marina permits, Bill Munger estimated that "we spent about \$30,000 getting building permits for Taylor Point, but conservatively avoided another \$20,000 by moving inland in 1985."

4. The boatyard and repair shop easily survive bad weather, uphill away from hurricane flood waters and other storm waves. Historically, almost all major hurricanes have flooded both buildings at the marina at great loss to the business, whereas the inland sites are about 50 feet above the flood-danger zone.

"When we haul a boat, it is hauled on our safe ground, and we don't need to worry about it," Munger said. "We also have much lower building maintenance costs inland because they get no damage during floods." For example, on August 19, 1991, Hurricane Bob caused coastal flooding in Narragansett Bay 9 feet above mean high water. "Conanicut Marina suffered \$60,000 damage to its docks and store, yet only \$6,800 at the yard to repair shed doors which blew off, and no loss at the repair shop."

5. All boat and engine repairs are done inside buildings and are not subject to rain runoff problems. This makes controlling pollutants more effective and easier. Conanicut Marina has been using dustless sanders for over 5 years. "We came onto this early when the technology became available," Munger said.

Other improvements and benefits

Other environmental protection measures at the boatyard include permeable parking lots, a designated hull maintenance area, and spill-proof oil changing. The marina has oil spill gear at the fuel dock and encourages the use of oil pads in boat bilges. An outboard test tank at the shop has a water settling system to separate out the oil with absorption pads. Recycling of oil, cardboard, shrink-wrap plastic, bottles, cans, and batteries is done at all three sites.

"All our serious boatyard work—fiberglass, painting, mechanical overhauls—is done at our repair shop inland," Munger said. "At our storage yard, the boat sheds are spread out so we can easily move any boat in/out for work in our repair shop. That's a luxury few boatyards on the water can afford to have. Waterfront land is just too precious." The shop is 0.5 mile up the road west of the docks, and the storage yard is 0.75 mile north of the marina. The yard and shop are 1.5 miles apart, north to south. Trucking boat trailers averages 6 to 10 minutes from point to point.

"We do most of our boatyard work during the fall and winter when we have the island to ourselves, but try to avoid the peak tourist season in July and August," added Munger. "We are a boatyard which caters to both those folks who want to take their boat home (do-it-yourselfers) and those who want to hang their hat on a boatyard to do all the service work."

Because of over-road limitations—14 feet high by 13 feet wide—"We are not able

to haul vessels greater than 50 feet LOA. We are really chasing the service market less than 44 feet for our winter (dry business) program. But in our summer (wet) program we are good up to 200 feet. When larger boats need haulout and dry-land work, we haul them to boatyards across the bay in Newport [Rhode Island] that specialize in 50-foot-plus vessels."

"Because we have a fuel dock and do bottom cleaning in the marina, we needed to apply for a Storm Water Permit under the state's general permit for boatyards. If we didn't do hull cleaning here, we probably wouldn't need any permit." (The permit is in the application stage.)

A fixed pumpout station is on the town pier located at the middle of Conanicut Marina. The station was paid for with a Clean Vessel Act 75% grant matched with 25% town harbor money and is tied into the municipal sewer line. Pumpouts, since start-up in 1994, are free and do-it-yourself. Conanicut Marina provides maintenance for the pumpout and wants to add a pumpout boat to service boats on moorings and in docks. "Last summer over 100 pumpouts, averaging 25 gallons, helped Rhode Island and Jamestown carry out the clean water program," said Munger. "There were several boats in the 65-foot range which pumped out with 150- to 200-gallon tanks." However, since the pier is public-access, there are some user conflicts. On days when many people are fishing at the floating section, boaters find it hard to tie up to do a pumpout.

The marina is a multimodal transportation site serving the public with access by foot, boat, bicycle, car, bus, and ferry. With auto parking very limited, Conanicut Marina provides long-term parking at its boatyard during the peak tourist season, thus reducing any runoff potential from those cars.

Expansion plans for 1996 include building new and larger restrooms at Conanicut Marina and leasing the nearby historic Clark Boat Yard. "To be named

Conanicut Marine Round House Yard, its 200-ton marine railway will greatly expand the hauling and repair capacity of the business. This only makes sense because we have the over-road trailers," Munger added. "And we won't need to haul the deeper draft boats at Newport any more. We'll keep all our service under our control this way."

Bill Munger was elected vice chairman of the Jamestown Harbor Management Commission.

As such, he demonstrates proactive involvement in coastal planning for clean water and good boating. Half of Jamestown's moorings are operated by marinas and the yacht club, with the rest privately owned by individual residents.

"Quality people look for quality boating facilities. We are certainly doing significantly less polluting of the bay," Munger stated, "and our customers respect that. We educate boaters with signs and by adding environmental protection language to all contract agreements."

Conanicut Marine Services clearly demonstrates that boatyard repairs can be done easily and profitably away from the waterfront, thanks to hydraulic trailers and less expensive land. By moving that work inland, the coastal environment is cleaner for both the ecosystem and the boating public.

"We are certainly doing significantly less polluting of the bay and our customers respect that."

8. Deep River Marina, Inc.

Publicity of Clean, Attractive Marina Pays

Location: 50 River Lane, P.O. Box 363, Deep River, Connecticut 06417
Telephone: (860) 526-5560
Interviewed: Douglas and Karen VanDyke, President and Sec./Treasurer
Owned by: Douglas and Karen VanDyke
Waterbody: Connecticut River

Environmental change

A combination of free pumpout service, clean restrooms and showers, attractively maintained grounds, dustless sanders, and environmental recognition increased the gross income of a Connecticut River marina.

The river marina

Once a rather small boatyard in need of improvement, Deep River Marina has become a full-service marina and a very attractive home port to boating families from New York, Connecticut, Massachusetts, and Canada. The marina has 200 slips and mooring capacity for 35 boats. Boat sizes range from 16 to 45 feet with the average boat at 28 feet LOA; 90% are powerboats. All but 23 slips were leased for the summer, with the remaining used for transient visitors. The VanDyke's four full-time and two part-time summer staff manage the docks, moorings, pumpout, fuel dock, and ship's store. "We do all haulout and launchings with our travel lift, hydraulic trailer, and crane. But outside contractors do all boat repair work here (to engines, hulls, rigging, fiberglass, canvas, and painting)," Doug said, "including the lawn

and garden maintenance, and restroom cleaning. They are environmentally like-minded, and do all work the same way we do it." Four staff remain year-round to store 150 boats on land.

Located on the Connecticut River, the marina is on a calm stretch of tidal fresh water off the main channel and is well protected from passing wakes and foul weather. Deep River is well sited, above popular Essex and below Hartford. Its only neighbor is the Essex Valley Railroad, which makes several tourist runs a day along the marina's property line. Within 2 miles are 5 other marinas and boatyards, with a combined boat population just under 1,000. The boating season runs from mid-April to mid-November. The original boatyard was built in 1955.

Management measures

Deep River Marina achieves the marina management measures for storm water runoff control, sewage facility, sewage facility maintenance, and solid waste, as well as water quality assessment, shoreline stabilization, fueling station design, liquid materials, petroleum control, boat cleaning, and public education.

Costs/benefits

Deep River Marina won NMMA's first Boating Facilities Environmental Responsibility Award for its clean marina in 1993. It is just one of several national and regional awards earned by Doug and Karen VanDyke for their environmental consciousness. "We are constantly amazed just how many people are aware of articles about us in the paper," Karen said. "We keep things clean and offer free pumpout service. Paying attention to our customers and taking care of the environment—that's where we make our living." And good publicity pays.

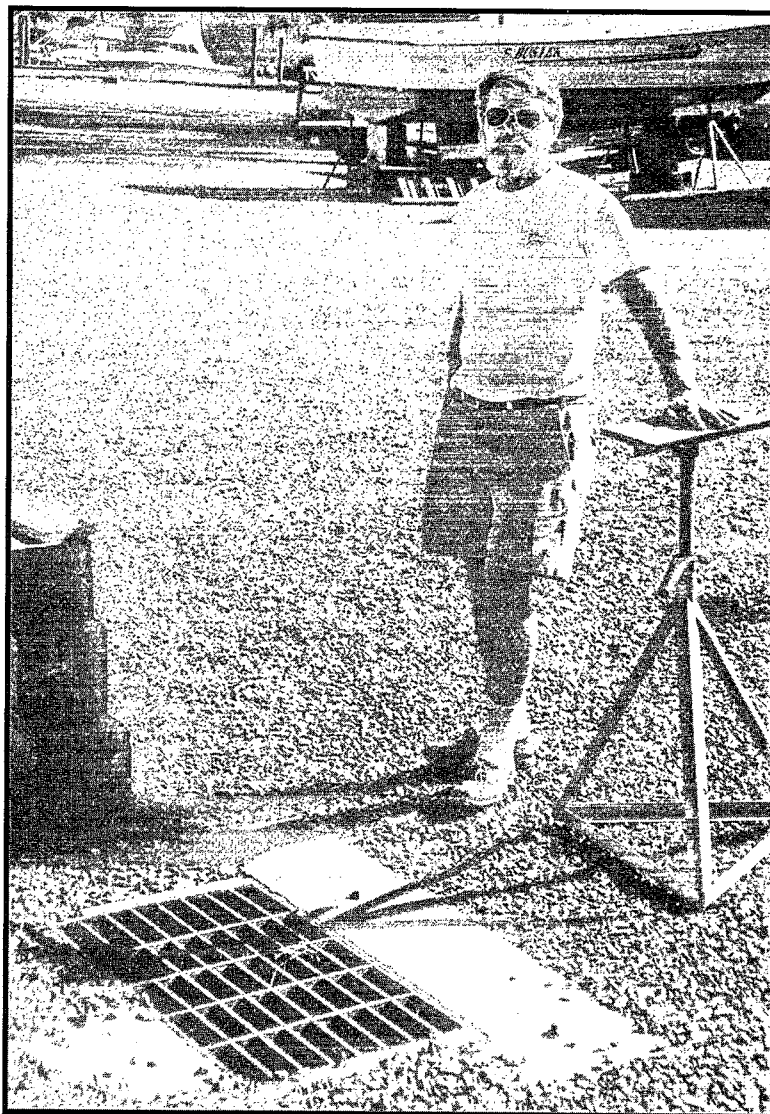
It cost \$15,000 to buy and install a pumpout on the fuel dock in 1989, plus \$6,000 more for four dustless sanders in 1994, bought for environmental reasons. Over the past year, the clean marina costs were \$4,500 on labor at the pumpout dock, cleaning restrooms and gardening; \$8,000 on flowers and lawns; and \$500 for pumped out septic removal; plus \$2,720 amortization of capital purchases, for a total annual environmental operational cost of \$13,000. New and added income—attributed to "our clean marina and efforts"—in summer slips, winter storage, and added fuel sales, plus publicity value, was placed at \$86,800. Doug added, "Everything we do works together. It's just as easy to do it the right way, and it doesn't cost that much more." In fact, after he calculated the costs and income derived, Doug noted, "I am surprised and pleased that our net income associated with environmental improvements was an additional \$71,000 this past year."

Environmental improvements

Deep River Marina sent a postcard to customers commemorating the 20th anniversary of Earth Day, April 1990: "As a marina and boatyard we feel it our moral obligation to help inform the boating public of ways we all might conserve our natural resources, fight pollution and preserve the

very waters we and our families enjoy. We must work for nothing less than clean air and clean water—trash free, non-toxic rivers included. . . . Let us not forget the original spirit of Earth Day." That postcard ended, "Let's be careful out there!"—the ending on every Deep River Marina letter and the marina's exit sign. Environmental education of the public is a continuous process that has attracted boaters who appreciate and seek the VanDykes' kind of clean marina.

"When we bought the marina in 1971, no one even heard of the environmental



Doug VanDyke stands beside an oil/water separator drain in his immaculately clean crushed stone work yard and parking lot.

movement,” Doug said. “From day one, we kept the marina picked up—a good clean yard.” They have many good stories to tell...

“I am surprised and pleased that our net income associated with environmental improvements was an additional \$71,000 this past year.”

- Mandatory use of dustless sanders has been required on all bottom work in the yard since 1994. The store

rents each Fein sander for \$15 per hour and sells the sand paper. “As an incentive, we give each boat owner the first 2 hours per year free. This has worked very well, and almost everybody understands and complies. The first

year we had several complaints. One guy went out and rented another dustless sander elsewhere, but discovered he spent more than he should have; this year he used our equipment. Our dustless sanders kept over 200 pounds [of paint dust] out of the environment this year.”

- The VanDykes were the first in the area to install a pumpout (1989). “At first we charged \$10 for the service, but no one was using it. So we decided it was time to make a commitment to cleaning up the environment by offering free pumpout service to all noncommercial vessels using the Connecticut River. Now boats come here from many other marinas to get the free pumpout, and most buy fuel at our dock while here. We ask that each boat buy a pumpout thru-hull adapter, from us, which allows quick connect to our evacuation hose. Even those not buying fuel when they get pumped out must feel guilty because most return later for fuel, or do become seasonal customers,” said Doug. “This summer we kept 6,000 gallons of sewage out of the river.” Deep River has applied for a federal CVA pumpout grant to help maintain

and operate its system. A unique, home-made, land-side outside dump station is also available free to those with portable toilets.

- Storm water runoff from the parking lot is controlled with 50-foot grass buffers. With picnic tables, shrubs, trees and flowers, the marina looks more like a park than a boatyard. All parking areas and driveways are covered with crushed stone. A tongue-in-cheek sign slows cars by saying that they are in a “No Wake Zone.”
- A special drain traps silt and skims oil from the work yard and parking area before it can reach the water, “but we rarely ever find any oil in the tank because there is so little spilled on the ground. The Connecticut DEP really likes it a lot. They even brought participants in a pollution-control conference on a tour of Deep River Marina to illustrate marina best management practices.”
- The VanDykes listed adjacent wetlands as environmentally sensitive for long-term protection with The Nature Conservancy.
- Water-saving toilets and shower heads are used in the marina’s immaculate restrooms. Hoses on docks are required to use shutoff nozzles to reduce wasting water while owners keep their boats clean.
- A portable oil-changing unit that uses a vacuum tank to suck oil out of engines through the dip-stick tube makes oil changing easy and spillproof. It is available for rent at the marina store.
- “We banned use of toxic antifreeze (green color) for winterizing engines”, said Doug. “I had to get tough with only two customers the first year and made them immediately remove and replace their antifreeze.”

- Color-coded trash containers reduce the volume of waste going to the landfill by collecting bottles, cans, cardboard, and plastic for recycling. Waste oil is also collected in an aboveground 400-gallon tank, contained inside the lower half of a cement septic tank, for recycling at no cost to the marina. "The market for used oil comes and goes," Doug stated. "Years ago, they paid us to take it; then we paid them. Right now they take it away at no charge."
- At the fuel dock, more than 100 feet of oil containment boom is stored in a locker for emergency use during spills. Boaters are encouraged to use bilge oil absorption pads, which are also sold in the marina store.

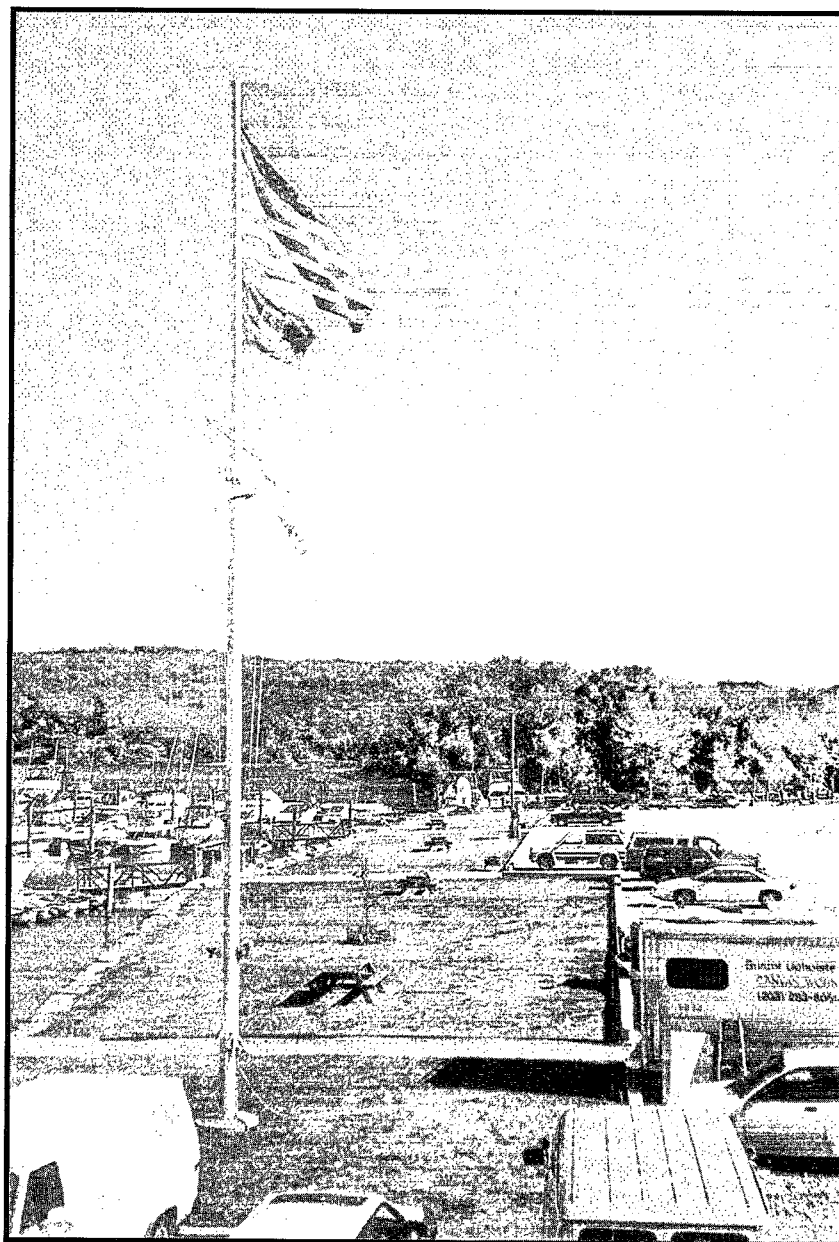
Other benefits

The U.S. Department of the Interior presented its highest national award, "Take Pride in America," to Deep River Marina in 1991 for its participation in, and hosting of, a 3-year Atlantic salmon stocking project on the Connecticut River, conducted by the U.S. Fish and Wildlife Service and the Connecticut Department of Environmental Protection. More than 20,000 tagged salmon were released from the marina's waters in an effort to restore salmon runs. Scientists performing water quality assessment obviously found the marina's water quality high enough to raise the juvenile salmon.

"Look back, and we feel we've accomplished a lot," Karen was quoted in the Hartford Courant (May 6, 1994). "Looking ahead, and there's always something more to do."

Equipment source

- Dustless sander: Fein-Vac I, 10-gallon; Fein Power Tools, Inc., 3019 West Carson Street, Pittsburgh, PA 15204.
- Pumpout station: Waubaushene ARV 125-gallon; Waubaushene Machine and Welding, P.O. Box 99, 111 Coldwater Road, Waubaushene, Ontario, Canada.
- Engine oil remover: Slurpee Portable Vacuum System; Houghton Marine Resources, 712 Forest Street, Marshfield, MA 02050.



Deep River Marina added grass buffers between the river shore and the automobile parking lots to reduce runoff pollution and create a park-like atmosphere.

9. Edwards Boatyard

Environmental Improvements, Including Customer Contract, Yield Clear Benefits

Location: 1209 East Falmouth Highway, Route 28, East Falmouth,
Massachusetts 02536

Telephone: (508) 548-2216 **Fax:** (508) 457-9140

Interviewed: Charles Swain, President

Owned by: Charles Swain

Waterbody: Child's River, adjacent to Waquoit Bay and Nantucket Sound

Environmental change

This traditional boatyard made environmental improvements and has all slip customers sign environmental contracts.

The traditional boatyard

Entering Edwards Boatyard on Cape Cod is like a step back in time into a traditional New England yard with its array of white buildings showing each stage of business expansion. This full-service boatyard and marina is one of the few that still move boats on marina railways. Edwards uses four separate railways, with the help of a forklift, hydraulic trailer, and launch ramp. The small marina, with 48 slips and 8 moorings, has been at 100% capacity every year with a waiting list (except one summer during the recent recession when 4 slips were empty).

Seventy percent of the boats are powerboats, and 30% sailboats, ranging in size from 18 to 40 feet LOA, with the average 24 feet LOA. On a typical busy summer weekend, about 50% of the boats are used daily and 25% are occupied overnight. There are no liveaboards at

Edwards. Transient slips, a fuel dock and pumpout station, and a portable toilet dump station are available.

A major part of Edwards' income is from the repair business and winter storage of 180 boats. Yard services—including fiberglass hull repair, restoration of wood boats, and Awlgrip painting—are specialties at Edwards. Outboard, inboard, I/O and diesel engine repairs, sail and rigging work, and bottom cleaning are also available.

On-site facilities allow for servicing of small and large sailboats or powerboats up to 45 feet LOA with a 4.5-foot draft. Edwards has four marina railways, which run directly into separate buildings. The largest is 50 tons. A hydraulic trailer is used to move boats around outdoors and to/from the storage yard 0.8 mile inland. The retail store sells a full range of marine supplies and engine parts, and has canoes for rent. Electronics are sold and serviced. Nauset Marine, a tenant, sells new and used boats.

Within a 2-mile radius are over 2,400 boats, 2 yacht clubs, and 1 boatyard. The Town of Falmouth's public launch ramp and parking lot abuts Edwards. "I've noticed a trend toward smaller boats on

trailers around us," Swain observed, "and I keep the gate to the parking lot open so many of them can visit our store."

Edwards Boatyard was started in 1951 by Swain's grandmother and her Norwegian husband, Einar Edwards. They built 27- and 32-foot wood Jersey sea skiffs, but that business died out about 25 years ago as fiberglass boats began to dominate the market. Swain's father and uncle ran the business until Charlie took over in 1979. Since then Edwards has focused on engine service and repair and restoration of fiberglass and wooden boats. "Our marina land has been in continuous maritime and seafaring use since the 1850s, when White's Landing was established to ship goods to/from Nantucket and other ports." History is very much alive when Charlie Swain speaks. "My family has always been seamen and whalers from New England ports."

Management measures

Edwards Boatyard achieves the marina management measures for sewage facility, sewage facility maintenance, solid waste, liquid materials, and public education, as well as habitat assessment, shoreline stabilization, storm water runoff control, fueling station design, petroleum control, and boat cleaning.

Costs/benefits

Edwards Boatyard spent about \$114,000 to make environmental improvements. To maintain the environmental improvements, the boatyard incurred operation/maintenance costs of \$18,100 in 1995. Estimated new income because of these changes in 1995 was \$100,000, plus \$10,000 worth of free publicity. The yard also installed a replacement pumpout, at a cost of \$4,500, of which \$2,100 was covered by an EPA Regional grant. Net benefits related to environmental improvements during 1995 were approximately \$82,000.

Environmental improvements

Keeping everything "neat and clean—but not fancy," is the way owner/manager Charlie Swain repeatedly describes his approach for the boatyard. To do that he runs an environmentally compatible boatyard. Starting about 16 years ago, he began making environmental improvements. Unlike most boatyards, the dominant center of Edwards is a nicely landscaped circular lawn with two ornamental pools, flowers, shrubs, trees, flag pole, and picnic tables for his family, friends, staff, and customers. "Making it nice for people to be here is important to me," he said. "I spent about \$5,000 on landscaping."

His next step was to install a pumpout in 1980—then rare in coastal New England and one of the first in Massachusetts. "Back then we might do one pumpout a week. I made 'no discharge' the marina policy 5 years before Massachusetts and EPA designated Waquoit Bay as one of five no-discharge areas in the state in 1964. Last year I spent another \$4,500 upgrading with a new Edson pumpout station and added a 2,000-gallon tight tank. Now we average 24 pumpouts per weekend." A commercial septic hauler took 2,400 gallons to the town sewer plant in 1995 at a cost of \$150.

"In 1995, I also replaced the in-ground fuel tanks with two double-walled tanks (6,000-gallon gasoline, 1,500-gallon diesel), cathode protection, electronic monitoring for leaks, and overfill protection for a cost of \$75,000. Worried about potential contamination getting into the dirt floors of our repair sheds, I paved the floors and railway ramps with concrete (cost \$15,000) and added drains (\$3,000). In the boat repair and storage buildings, concrete floors have replaced dirt floors of the past, so debris is retained and can be swept up properly. Sediment traps, at a cost of \$6,000, went into the lower, sloping floors of all four marina railways to capture and hold spills of oil, resin, and other hazardous material for proper disposal. Adding in the



*Charlie Swain, President
of Edwards Boatyard.*

\$15,000 cost of getting the coastal permits, including a 21E test report for pollution and engineering, I estimate my total improvements cost \$114,000."

In 1995 Edwards spent \$7,000 to clean the traps and maintain the landscaping, \$500 for oil pads for the oil/water separators, \$600 to remove waste oil, and an estimated \$10,000 of the owner's time attending marina environment-related meetings and supervising the work environment.

Swain realized that to keep the marina and its waters neat and clean also meant getting the boating customers to help. To do this, in 1992, owner Swain chose to create and make mandatory an environmental agreement as part of his slip contract. It is updated annually and costs only his time. It reads (in part):

Edwards Boatyard Rules & Regulations: "We have had to establish the attached rules in order for all of us to make Edwards Boatyard, the Childs River and its ecosystem a cleaner, safer and more harmonious place to be. Your (mandatory) cooperation is appreciated. . . ."

Thirteen of the 23 rules and regulations are clean water-related, including prohibi-

tions on wake, liveboards, sewage and contaminated waste discharge, fuel spill, fish cleaning in the marina, and excess noise. It spells out what to do with soaps and boat cleaners, dogs, and hazardous waste. The contract discusses the federal "no discharge" designation of the river and marina and the types of boat toilets allowed, and it warns that violators found polluting the water are subject to U.S. Coast Guard fines and termination of their slip use rights. The contract also lists eight services that Edwards has available "for the betterment of our environment," including restrooms, pumpout, rubbish disposal, hazardous waste management, bilge cleaning, maintenance of fuel vents and MSDs, plus "environmental and safety inspection of your boat." Boaters are encouraged to use oil-absorbing pads in bilges to help keep marina waters clean.

"At first a number of people made comments on it with some saying [regarding the no discharge designation] that they didn't need holding tanks. We lost a couple of customers, but our waiting list was called and we remained full. Two attorneys scratched out several words here and there before signing. Now that our bay is an official no discharge area, everyone is more aware of the environment. Everyone just accepts what we are asking and signs the contract. Boaters like clean water—and clean water is good business. My customers congratulate me for being environmentally friendly."

In 1995, Edwards Boatyard received a \$2,100 pumpout grant as part of a U.S. EPA Region 1 demonstration project with the Town of Mashpee. "Our clean operation attracted an estimated \$100,000 extra business from people attracted to our environmental approach. And all the publicity we've received was worth over \$10,000 in paid advertising," Swain said with a smile. "In 1996 we need to complete our on-site storm water drains, as indicated in our storm water permit pollution prevention plan."

Other improvements and benefits

Like The Little Engine That Could, Edwards Boatyard has worked hard to maintain its traditional ways. But its environmental story, like so many other clean marina successes, is really about its third-generation owner, Charlie Swain.

"As a kid growing up in Falmouth, I could fish and shellfish anywhere on Waquoit Bay. I'm a native Cape Codder who moved away to Cleveland, Ohio, for college and work. There I saw how Lake Erie, once a terrible mess, had been cleaned up and turned around. When I moved back to Cape Cod in 1979 to manage the boatyard, I saw how our shellfish beds and fishing waters were closed because of pollution. This bothered me. I asked, 'What can I do?' First, I promoted clean water and education in the yard. There's nothing wrong with a marina having clean water."

"Next, as a business owner, I chose to become part of the coastal zone management (CZM) process—not to fight it. I got involved in the Massachusetts CZM Program, which designated Waquoit Bay as an Area of Critical Environmental Concern (ACEC). Governor Dukakis appointed me to the State CZM Citizen Advisory Board. I worked with environmental groups and the state to get meaningful regulations that we can live with. Look at the positive point—I am a businessman promoting the environmental movement." And Edwards Boatyard got lots of positive publicity, which attracted customers with a concern about the water quality.

To help control runoff, the marina's upland parking lot, which doubles as boat storage in winter, is not paved but covered with crushed shells. Most boat repair is done indoors. Nontoxic antifreeze is used for winterizing boat engines. "We only sell biodegradable products, such as cleaners, in our store," added Swain. Recycling is encouraged for oil, metal, and batteries.

"We made a two-wheel cart with a 50-

gallon tank a few years ago to take to each boat to collect their waste oil. This makes the process convenient for the customers, easy for us, and virtually spill-proof," added Swain. All hazardous waste is collected and recycled through a Safety Kleen contract. "We have a floating oil boom which, in case of a spill, we can pull across the 200-foot-wide river to protect what the Corps of Engineers designated the end of the navigable waterway."

Charles Swain did so well at environmental activism in his yard and Massachusetts that in 1994 he was selected as the one businessman nationwide to win the prestigious Walter B. Jones Award for excellence in business leadership from the National Oceanic and Atmospheric Administration (NOAA). During the presentation ceremony in Washington, DC, Swain was thanked "for making significant contributions to improve or protect the coastal or ocean environment and for demonstrating the ability to balance business with the environment."

"I've always been progressive," Charlie Swain remarked in his thick Yankee accent. "They just wanted to thank me for doing all this and being an example to other marinas." Indeed, he is an outstanding example of what one traditional boatyard business owner can do in both his marina and state.

"Our clean operation attracted an estimated \$100,000 extra business from people attracted to our environmental approach. And all the publicity we've received was worth over \$10,000 in paid advertising,"

Equipment sources

- Pumpout: Edson International, 460 Industrial Park Road, New Bedford, MA 02745-1292.
- Hazardous waste removal: Safety Kleen, 1000 North Randall Road, Elgin, IL 60123-7857.

10. Elliott Bay Marina Inc.

Clean Environment Awards Win Customers

Location: 2601 West Marina Place, Seattle, Washington 98199
Telephone: (206) 285-4817 **Fax:** (206) 282-0626
Interviewed: Martin Harder, General Manager
Owned by: Three Seattle boaters and businessmen
Waterbody: Elliott Bay, Puget Sound, Pacific Ocean

Environmental change

Elliott Bay Marina was built to exceed environmental standards for habitat creation, pollution control, and water circulation, and it operates with effective clean marina practices for hazardous waste, spill prevention, dog waste, recycling, habitat testing, and educational programs.

The newest megamarina

Since it opened in 1991, after 12 hard years in the planning and permit process, Elliott Bay Marina has been recognized as a world-class facility that exceeds required environmental regulations. At a cost of almost \$50 million, the private owners put many good things into this commercial marina. Ten full-time, year-round employees and 12 seasonal part-timers are kept busy managing 1,200 slips. The slips range in size from 32 to 63 feet with 52% of the boats between 36 and 50 feet LOA. The boat types are evenly split between sailboats and powerboats, which reflects the great sailing conditions on Puget Sound. Forty boats are liveaboards. Another 60 docks must remain available for transient boaters per agreement with the city.

Boat rentals are available, as are new and used boat sales. The Seattle Yacht Club has an outstation and clubhouse in this marina. Repair services available at Elliott Bay are for light maintenance only. Other services include a fuel dock, pumpout, laundry, and grocery store. Three restaurants in the marina illustrate the value added by being located with a water view in a busy marina. A time-sharing program is also available, similar to condo time-sharing.

While the marina operates year-round, the prime boating season is from April through October each year. Within a 2-mile radius there is one other marina, and between them the two marinas serve almost 4,000 boats.

"Providing first-class service to the boaters is as important as protecting the environment," Martin Harder said. "We try to meet every boat that comes in and help them with their lines. I was in the hotel business 30 years, so I try to run the marina like a hotel. Our mission is to beat the boater's expectations. To help do that I've hired a concierge to help our boaters any way possible." As a result, Elliott Bay Marina has a strong customer-service

practice that reflects a profound change in the way marinas across America are going to be managed.

Management measures

Elliott Bay Marina achieves the marina management measures for habitat assessment, solid waste, and liquid materials, as well as marina flushing, water quality assessment, shoreline stabilization, storm water runoff control, fueling station design, sewage facility, sewage facility maintenance, fish waste, petroleum control, boat cleaning, and public education.

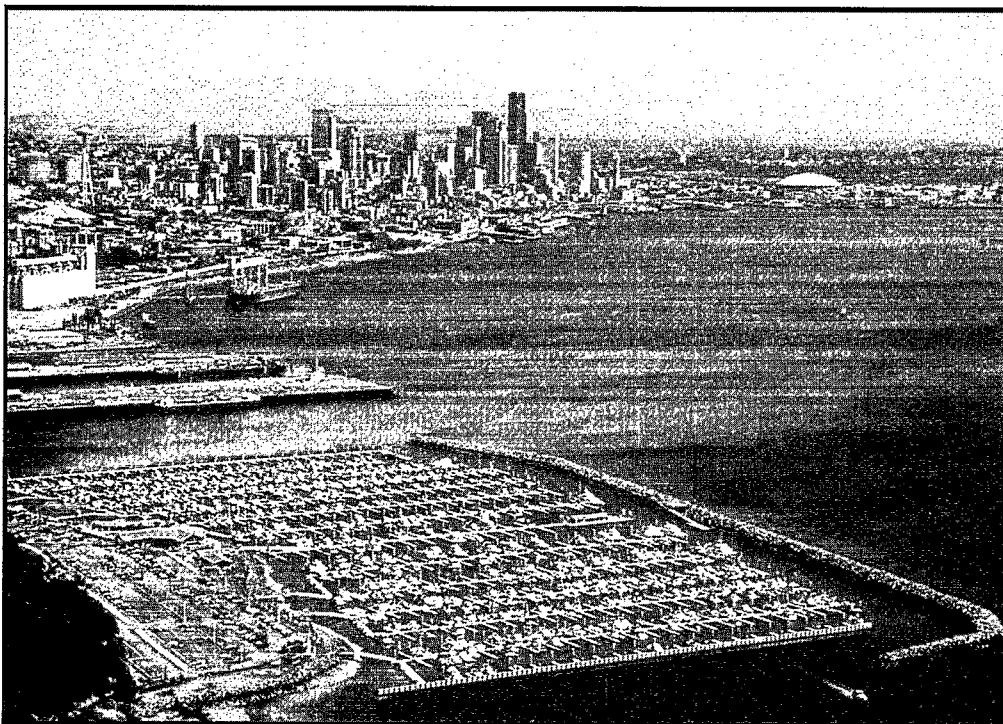
Costs/benefits

Elliott Bay Marina is a 4-year-old marina built to exceed environmental standards at considerable cost, but the combination of its newness and very clean operations filled 88% of the slips by 1995. While environmental protection and enhancements are very much visible, not all construction costs have yet resulted in measurable economic benefits. But there are some bright spots.

Slip (moorage) rates at Elliott Bay Marina average 10% more than those of other marinas in its market area, which translates into \$380,160 more in 1995 at 88% occupied. The hazardous waste program costs \$5,000, but because staff pickup prevents mixing of used oil, fuel, and solvents, an estimated \$2,000 to 5,000 extra cost is avoided. Handing out dog waste disposal bags, at 19¢ each, is less expensive than sending staff out with shovels every day, for a labor saving of about \$4,000.

Environmental improvements

There are three aspects to Elliott Bay Marina's environmental improvements: the temporary steps taken during construction to reduce or ease the negative impacts on marine life; physical features built into the marina to enhance, protect, and encourage marine life; and operational practices that control pollutants or prevent them from entering the water. Since the temporary improvements were completed by 1991 when the marina opened, we'll focus on four programs conducted in 1995.



With 1,200 slips, Elliott Bay Marina is one of the largest privately owned and operated marinas in the United States. (photo by Elliott Bay Marina)

1. Habitat and water assessment

A 5-year habitat testing program was required in the marina's building permit and concluded in 1995. An interim marina life monitoring report, written by the environmental consulting firm Jones and Stokes, found the following benefits:

- Wide openings between the rock groin-type breakwaters, docks, and beach give easy access to migrating juvenile salmon leaving Puget Sound, while providing good water circulation and tidal changes inside the marina basin.
- A man-made 1,500-foot-long sandy beach along the marina's shoreline replaces habitat lost when intertidal areas were filled for the parking lot. The beach acts like "a long salad bar for young salmon," which generally feed in shallow water.
- The floating marina moorage (docks) was built of concrete floats and anchoring piles. Concrete was chosen because it is an excellent, long-lasting surface that quickly attracts and supports extensive growth of fouling life, including seaweeds, barnacles, and mussels.
- The rock breakwater has become an extensive artificial reef (as has the dock structure), and its 2,700-foot length yields a surface area 80 times larger than the original ground it covered. The breakwater is a vast growing area for underwater plants, including both bull and smaller kelp.
- East of the marina, a 7.5-acre rock beach was created, as well as a 0.5-acre beach on the west side, in previously unvegetated sites. Both serve as "migration" beaches covered with marine growth/food for marine fish and young salmon. Enormous numbers of small animals typically eaten by salmon were found on these new beaches in response to the

growth of marine plants there and in the marina basin. During the peak salmon migration period, the feed animals were counted at over 8,000 per square foot.

- Small chum salmon, which tend to hug the shoreline, were observed swimming inside the breakwater. Schools of young salmon and herring move throughout the marina basin.

"Habitat testing is a requirement of our building permit for 5 years. The cost is over \$50,000 per year," Harder said. "No cost benefit! The results are excellent, although Fisheries, Army Corps of Engineers, Department of Ecology, etc. are not sure what to do with the information." The marina industry can put the information to good use around the nation to demonstrate the artificial reef benefits of marina structures. "We've seen an explosive growth of marine creatures along the entire food chain, from plant life up through marine mammals."

2. Hazardous waste program

"We have marina staff pick up almost any hazardous waste from the owner aboard his/her boat, dispose of it, and return the containers," Harder said. "We pay about \$5,000 per year for this effort, although recently we have found a source to pick up used oil free of charge. I believe that handling this with our staff—not depending on the boaters—saves the potential high cost for disposing of 'mixed' hazardous materials, probably \$2,000 to \$5,000 per year."

Elliott Bay Marina defines hazardous waste suitable for marina collection as including antifreeze, paint, thinner, oil, filters, bilge water, batteries, gasoline, and oily rags. "Of the total, about 80% is used engine oil," said Harder. Each boat has an utility charge of \$7.50 added to the slip rent, which pays for non-electricity charges and the hazardous waste program.

3. Dog waste collection

With floating piers so far from the lawns around the parking lot, it is not surprising that many dogs do not make it to shore before creating a mess. "We had to send dock hands out every day with shovels to clean up after the dogs. The staff didn't like doing this job. But many boat owners complained about this problem," said Harder. "Just before July 1995 we solved the problem by giving out disposable plastic 'Dispoz-A-Scoop' bags for dog owners to clean up after their pets. They simply scrape the stuff off the dock, seal the bag, and toss it into a trash container. This worked so well, we handed out 2,000+ dog waste disposal bags through September. At 19¢ each, this cost less than sending staff out with shovels. Customers are real happy with this system, whether they own dogs or not. Now many customers say, 'You guys keep doing it right.'"

4. Education

Environmental education is the key to the Elliott Bay Marina success story. Signs, brochures, and a 65-page environmental guidebook given to customers all carry the same message. Typical is the "Clean Environment Statement" that opens the marina rule book: "There is nothing better for recreational boating and the marina business than clean water and a clean environment. Everyone on a boat is so close to the water that any floating litter or pollution can quickly spoil the fun. Each of us must take the stand for clean water!"

Elliott Bay publishes a quarterly Tidings newsletter. Every issue contains one or more articles that educate customers on cleaner boating. A recent issue alerted boat owners to use environmentally friendly bilge cleaners.

Signs stimulate environmental awareness. At the head of each dock notices are posted about how to call for hazardous waste pickup, where to find petroleum-absorbent materials, and what to do if a spill should occur.

"All new marina tenants sign a slip agreement that includes a promise to follow stringent rules to protect the environment. Then they are each given a free bilge sock (retail price about \$6) to absorb oil and fuel that might otherwise be pumped overboard with the bilge water. Getting a bilge sock starts our educational process."

"Education, in the long run, saves us lots of money," said Harder. "Ninety-five percent of our boaters are visibly concerned about the environment and try very hard. If they see an oil slick, they'll tell us right away. I've found that if you make your customers feel good about being environmentally conscious, they'll feel good about being your customers. Our boaters are very proud of what we do here."

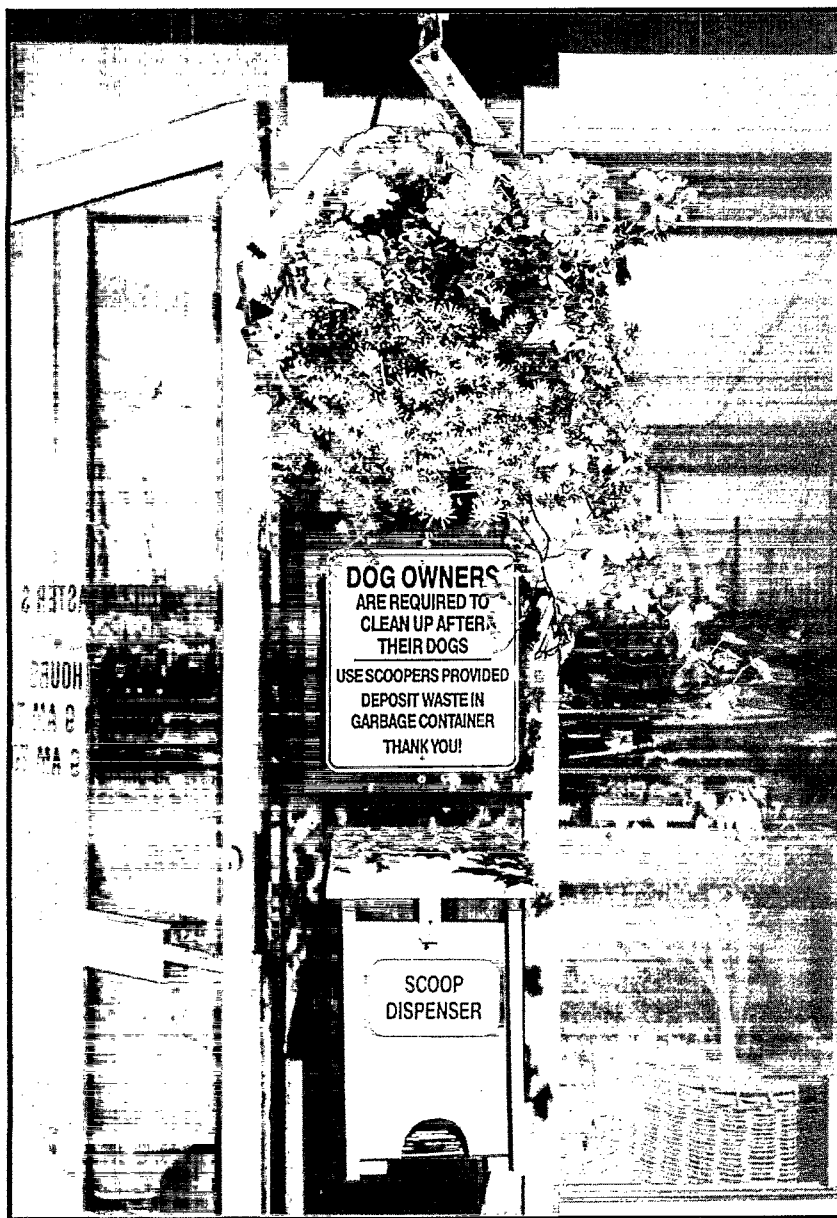
Other environmental enhancements

The 900-car parking lot was built with a series of storm water drains and traps for separating petroleum from the runoff. More than 500 trees, 6,000 shrubs, and wide lawns were planted to act as runoff buffers, control erosion, and beautify the area.

The marina fuel dock was designed with double-walled tanks and fuel lines, all equipped with monitors, sensors, and automatic shutoff should a leak occur. Oil booms, spill containment kits, and an aluminum pontoon boat are at the ready should a spill occur in the marina, or to head off one that is drifting in from nearby commercial shipping piers.

Holding tank pumpouts are free to resident boats. The marina saves \$200 per month by recycling glass. Free—but expensive—testing for the level of zinc protection (electrolysis) is given to private yachts. "We pump out sinking boats with our in-house pumps. We saved five vessels in the past 2 or 3 years (had to call the fire department twice to provide more pumps)," Harder added. "To me, it's mainly common sense and trying to do 'the right thing.'"

**"Education, in the long run,
saves us lots of money."**



"Dog owners are required to clean up after their dogs" at Elliott Bay Marina. (photo by Elliott Bay Marina)

Marina educates customers, prevents pollution, and controls potential environmental problems.

The environmental statement (above) ends with "Pollution control is everybody's business. Please help us be proud of what can be accomplished."

Martin Harder and his crew have done so well meeting this challenge that they have won four major awards for environmental awareness. The two most recent are the Association of Washington Businesses' Environmental Excellence Award for 1994 and the NMMA Boating Facilities Environmental Responsibility Award for 1995. The awards and resulting publicity help attract new customers to Elliott Bay's clean marina.

Equipment source

- Dog mess bags (used at Elliott Bay): Dispoz-A-Scoop; Petpro Products, 2651 South Fairfax Avenue, Culver City, CA 98232.

Sources for two other types of bags used at other marinas:

- Pet Pick-Ups; Right Brain Unlimited, P.O. Box 1035, Boulder, CO 80306.
- Mutt Mitt; Intelligent Products, Inc., 10000 Lower River Road, Burlington, KY 41005.

There are many other ways Elliott Bay

11. Green Cove Marina

Clean Marina Image Has Positive Impacts

Location: 41 Division Street, Brick, New Jersey 08724

Telephone: (908) 840-9090 **Fax:** (908) 458-6258

Interviewed: Jay Alan Davidson, President, and
Mike Petix, Yard/Environmental Manager

Owned by: Jay Alan Davidson

Waterbody: Metedeconk River, off Barnegat Bay

Environmental change

An overall positive environmental image was built with a combination of bottom wash water recycling, portable pumpout, trash recycling, and more.

The estuarine, small-boat marina

Green Cove Marina is a private full-service marina/boatyard used as a home port in 1995 by 261 boating families, a 93% occupancy. The marina summer season capacity is 280 slips, and 5 boats are stored on land. The boat sizes are considered small to average; 26% are under 20 feet, 31% are 21 to 25 feet, 27% are 26 to 30 feet, and the rest are between 31 and 45 feet. On a busy weekend, 80% of the boats are in use dockside or under way, with about 40% sleeping overnight. There is one liveaboard in the marina, and its owner keeps an eye on security and the environment. Ten full-time employees work year-round, supplemented by three part-timers in the summer. Other profit centers include launch/haulout service, bottom painting, electronic sales/service, hull and engine repairs, new and used boat sales, trailer sales, retail store, fuel dock, snack/beverage/ice sales, and a

swimming pool. Boats are hauled out with the Algonac straddle hoist, then moved by a yard trailer or forklift.

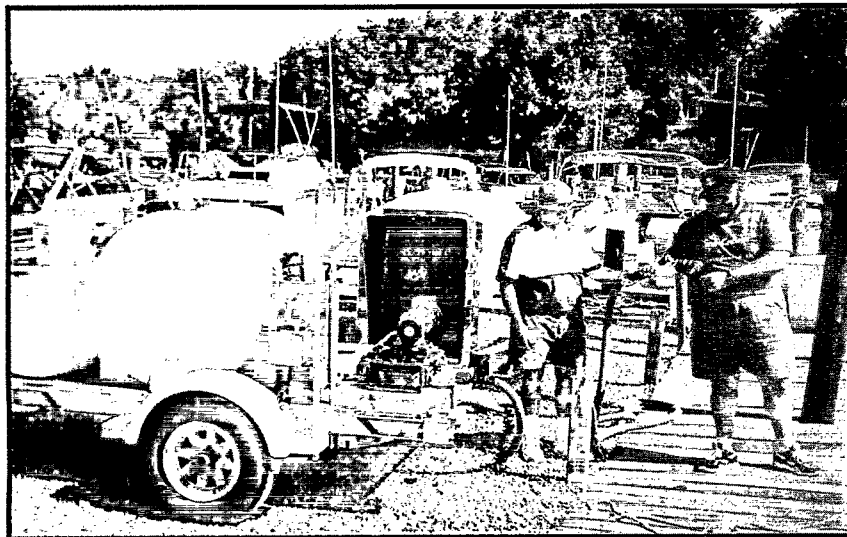
Within a 2-mile radius there are six other marinas on the river, serving a combined fleet of 1,000 to 2,000 boats. The boating season runs from April through November. Green Cove Marina was built in 1958 and bought by Al Davidson in 1973.

Management measures

Green Cove Marina achieves the marina management measures for sewage facility, maintenance of sewage facilities, and solid waste, as well as marina flushing, shoreline stabilization, storm water runoff control, fueling station design, liquid materials, petroleum control, boat cleaning, and public education.

Costs/benefits

A combination of low-cost clean marina changes at Green Cove Marina has attracted new customers and income. Recycling costs little, yet has eliminated the need for a second dumpster that would have cost \$2,700 per year. The trailer-mounted pumpout station cost \$6,300, while the boat bottom wash water filter and recycling



Trailer mounted pumpout system goes to the boats, or is available at Green Cove Marina's fuel dock, as shown by owner Alan Davidson and Mike Petix, yard/environmental manager.

system cost \$1,500. These improvements helped attract about 8% more customers, who wanted to be in an environmentally friendly marina, for an estimated annual slip increase of \$27,000. Water clarity and quality in the marina basin have improved over the past year.

Environmental improvements

As seems typical of marinas that have decided to be actively pro-environment, Green Cove Marina has implemented a range of low-cost improvements that have helped both the environment and the business.

When Ocean County started a recycling program, Green Cove was one of only two marinas to participate. A fiberglass "recycling bell" container is provided and emptied free by the county. A commercial waste hauler provided a 4-yard dumpster for the marina's cardboard with no-cost pickup. "Without recycling," owner Al Davidson said, "we needed a second trash dumpster in the boating season to avoid overfilling on weekends. It would have cost us \$450 per month." The annual saving from recycling is currently \$2,700.

In response to concern about water quality around the marina and in response to the call for boat sewage control,

Davidson said, "We mounted an electric 40 gallon-per-minute diaphragm pump on our own trailer (cost \$1,000), added a 225-gallon holding tank for a total cost of \$6,300, and had our own movable pumpout station. We keep it at the fuel dock for convenience of use, but we can go to boats in the slips. Marina staff does the pumping out, and our customers like this. The number of pumpouts increases each year."

A \$2,600 pumpout grant helped defray the pumpout cost. Because the system is portable, no coastal permit was needed, saving another \$1,000. Income from the \$5.00 pumpout fee from 500 pumpouts was \$1,700. It costs an estimated \$1,900 for labor and \$50 for electricity. Green Cove's owner, staff, and customers are proud of their clean marina efforts, which, according to Davidson, "have helped attract about 5% to 8% more customers who seek an environmentally friendly marina." The new slip income is estimated at \$27,000. "If anyone asks, I would recommend buying a ready-made portable pumpout trailer instead of making your own."

"This fall we are using free 1996 season pumpouts to all boats that sign up for a 12-month contract for winter on-land storage and summer slip rentals. Our offer has just started, and in the first week two new winter storage customers signed on. While we won't know until late fall how many other new customers will be attracted, just these first two paid for the promotion program," noted Davidson. "Most boat owners want to use the pumpout service regularly, and our free promotion is raising interest."

"There is a visible improvement in the water quality. It appears cleaner, and there are more crabs, fish, and ducks seen around our dock," claimed Mike Petix, the marina environmental manager. "We think the pumpouts have really helped."

EPA has identified boat bottom washing as a source of pollutants needing control. "To do this, we modified the high-pressure wash-down pad beneath our rail-mounted

Algonac straddle lift," explained Petix. "We created a sump drain system and a lift pump that pushes the dirty water into our own designed filter and all-plastic recycling system of a series of three filtering drums (55 gallons each) and a 225-gallon holding tank. It cost \$1,500 to build in parts and my labor, excluding the building and existing cement pad. We are still tinkering with the setup to make it simpler. But it works good, and you should see all the muck it filters out which used to go into the water. We now dry it and send it to the landfill. This clean pressure-wash system appeals to our environmentally oriented customers."

"The most common comment people make is 'How clean the marina is.' Customers also feel good and adopt our clean marina attitude. There is a pride in cleanliness here," added Davidson. "In the past 2 years each boating family has set up its own 'backyard' adjacent to its slip, and they put pressure on neighbors to keep us so clean not even a cigarette butt is found on the ground."

About 4 years ago Ocean County used a grant to make a video to show schoolchildren how marinas dovetail with ecology. "From all the marinas to choose from in the county, they chose Green Cove to demonstrate its positive impact on the environment and the economy, and made the whole film here," Al Davidson stated proudly, "and the publicity did not hurt the business."

Many small improvements have been made to make Green Cove Marina cleaner in operation and appearance. Every boat with an inboard engine has an oil-absorbing pad in the bilge, and the fuel dock has oil spill containment equipment at the ready. The old in-ground fuel tank was removed and replaced by an aboveground tank in a concrete spill container. In the engine repair shop, Davidson finds it cost-effective and safer to use a commercially supplied, cleaned, and maintained parts washer; the cost is about the same as buying the solvent alone. Used oil is also recycled at a cost of

\$0.50 per gallon (but Davidson is tracking down another company that takes marina oil free).

Green Cove Marina has all customers sign a Customer Best Management Practices pledge when they lease a slip. They pledge to participate in the clean marina program and honor environmental rules based on the marina's own written BMP plan for its NPDES permit. A similar signed BMP statement is required of outside subcontractors before they can work on anyone's boat.

All auto parking spaces and roads are paved with crushed stone, which helps reduce polluted rain runoff.

Twice a year the marina newsletter is published, and each issue has articles about what is being done to keep the environment clean and ecological tips for boaters. Signs strategically scattered about the marina direct customers to restrooms, the recycling area, and pumpout.

In every industry there are quiet leaders, and Al Davidson is one of them. As an officer of the Marine Trade Association of New Jersey, he is a very proactive, tireless worker who is helping the marina industry prosper in a changing world of environmental regulations. Al has been a steady and practical voice in developing the Clean Marina national program, has participated in national forums on the CZARA nonpoint pollution management guidelines for marinas, and advises New Jersey on its CVA pumpout program. In his Green Cove Marina, he puts into action many of the practices he has been advocating politically.

"There is a visible improvement in the water quality ... We think the pumpouts have really helped."

Equipment source

- Pumpout: Edson Bone Dry Electric Skid Mount Pump; Edson International, 460 Industrial Park Road, New Bedford, MA 02745-1292.

12. Hall of Fame Marina

Megayachts Attracted to Convenient Pumpout

Location: 435 Seabreeze Boulevard, Fort Lauderdale, Florida 33316
Telephone: (305) 764-3975 ext. 101 **Fax:** (305) 779-3658
Interviewed: Bob Koerber, Dockmaster, and
Gary Groenewold, Florida Area Manager
Owned by: Westrec Marinas, Inc., Encino, California
Waterbody: Intracoastal Waterway

Environmental change

Full-service pumpout capability at every dock attracts megayachts and live-aboard crews for extended visits to this South Florida marina.

The megayacht marina

Hall of Fame Marina is so named because it surrounds the north and south shores of the International Swimming Hall of Fame with its Olympic competition pools and museum. It was built in 1985 and bought by Westrec in 1989. It currently has four full-time employees. The marina is strictly that—a “small” waterfront facility with “only” 43 large boat slips. The south side has 24 slips for smaller boats between 35 and 70 feet in length, averaging 55 feet LOA. The north face has 19 slips for large yachts up to 135 feet, averaging 105 feet LOA.

Slips are rented by the day and month, and most customers are transients staying for a short time or a season. The peak boating season runs from October through April each year. The marina reports 85% occupancy for the season, which leaves about six slips open for unanticipated transient visitors.

Half the boats are liveaboards, with three to eight crew and owners staying overnight. On a busy weekend about 60% of the boats have people staying overnight. Other services include a laundry, ice sales, vending machines, and limited parking. Nearby is the Fort Lauderdale Beach, many restaurants, hotels, and other tourist amenities.

Hall of Fame Marina is certainly a “world-class” facility and a jewel in Westrec’s chain of operations.

Management measures

Hall of Fame Marina achieves the marina management measures for sewage facility and maintenance of sewage facilities, as well as shoreline stabilization, solid waste, and public education.

Costs/benefits

Only a few marinas in the world can adequately accommodate, at the same time, dozens of cruising yachts over 100 feet LOA. Hall of Fame Marina is one of them.

For a capital cost of \$16,200, Westrec installed a pumpout system capable of pumping out megayachts daily in their own slips. With below-dock sewer pipes and

connectors at each slip, the marina staff routinely empties one or more 1,000-gallon holding tanks each day using a portable pump, at an annual labor and operations cost of \$3,788.

That full-service (staff-run) pumpout capability has put Hall of Fame in a very competitive position to attract and keep more megayachts for longer stays. The marina grosses an estimated additional \$300,000 in transient slip rental income per year—a very profitable service.

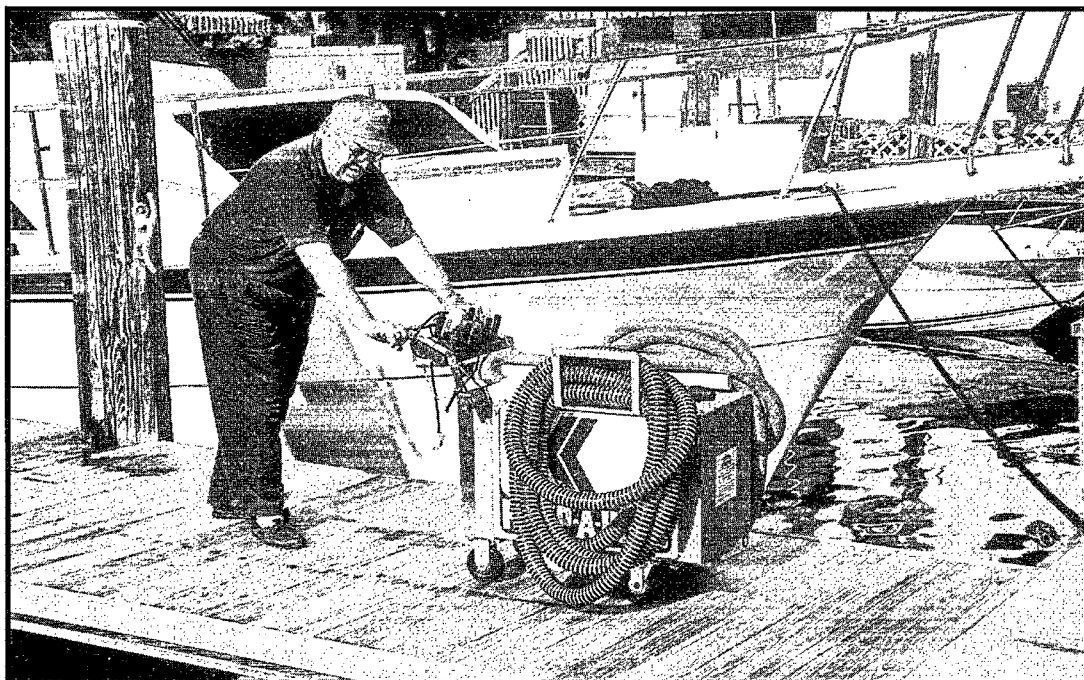
Environmental improvements

Fort Lauderdale is a destination for thousands of boats and is particularly popular for the professionally crewed large ocean-going yachts that seasonally cruise between continents. In peak season, Hall of Fame is host to up to 19 transient megayachts at a time, with 3 to 8 crew members living aboard each. These expensive vessels all have large holding tanks of up to 1,000-gallon capacity, averaging 500 to 600 gallons. Several boats have more

than one holding tank (compared to the one holding tank of 20 to 30 gallons average for most boats kept in marinas elsewhere). Surprisingly, only a few pumpout stations capable of handling such volumes are available in Fort Lauderdale.

“Many Florida state bottom leases for marinas limit their transient boats to 72 hours per marina visit—a nearly impossible condition to enforce. If it was enforced, it would cripple the marina industry in this state,” said Westrec’s area manager, Gary Groenewold. “We negotiated a 25-year bottom lease from the state in 1989, which allows visiting boats to stay up to 6 months per trip, subject to having boat sewage holding tank pumpout available to each boat.”

Previously, full pumpout service had been available for megayachts only at one fuel dock of a marina less than a half mile south on the waterway, which necessitated moving the large vessel from Hall of Fame’s berths to the other marina’s fueling/pumpout station and back. Although moving small boats for fuel and pumpout is



Portable pumpouts connect to a below-deck sewage collection system.

"The public respects you for not discharging overboard, and it shows our leadership in environmental consciousness."

relatively simple and fast, it is a time-consuming and costly exercise for a 100- to 150-foot yacht. Such a round trip for a megayacht, on average, requires a paid crew of a captain, engineer below, and two to five deckhands; consumes 50 gallons of diesel fuel (\$75); and takes no less than 2 hours, depending on tides and wind, including vessel preparation for departure and cleanup on return. The total estimated cost for the move is between \$300 and \$400, not including the pumpout charge.

With convenience in mind, Hall of Fame's then-dockmaster and licensed megayacht captain Gary Groenewold felt the best bet would be to extend a forced main plumbed to every dock to allow each yacht to be pumped out without the need to be moved. The main was tied into the city sewer line, as were the marina restrooms and showers. A small self-priming Keco Pump-a-Head portable electric pumpout machine on four wheels, without storage tank, was purchased. An extra-long suction hose and a discharge hose quick-connects to the above-deck hydrants. The service began in July 1989.

Pumping out a megayacht takes two people—the marina employee on the dock running the pump and a boat crew member to handle the working end of the suction hose. The pump sucks the sewage out of the boat's holding tank, then pushes it down into the below-deck discharge main, where it moves under pressure into the sewer main. "You know, there really is no odor when using our pumpout!" said dockmaster Bob Koerber, who generally runs the portable pumpout on call by the yacht crews. "For the average yacht, it takes me about 45 minutes to do a pumpout. The small yachts have 300- or 500-gallon holding tanks, while the large ones can have one or two 1,000-gallon tanks needing to be emptied. The actual pumping only takes 15 to 20 minutes per tank, with about

25 to 30 minutes more to move the portable unit to the boat, connect, run the pump, and disconnect from the boat, flush the unit, and return the unit to its storage place. However, just emptying one 1,000-gallon tank can take 80 minutes, plus my time to set up and return. In our peak winter season, I do about 25 pumpouts per month, but in the slower summer months that drops to about 6, for a total of 205 megayacht pumpouts last year."

Hall of Fame Marina does not charge its slip customers extra for the staff-run (full) pumpout service, which is included in their slip rental charge. "Our captains and crews really like not having to move the boat to be emptied," Koerber added. "That convenience helps attract them to Hall of Fame and encourages longer stays at lower operational cost. Several times a week another large yacht, from the Lauderdale area, will come into a slip just for a pumpout. I charge them \$5 to \$10 depending on the size of the boat."

"This pumpout system has not given us any maintenance problems. I like that setup," Groenewold added.

Megayachts and Fort Lauderdale are almost synonymous in the world's perception of that city. Claiming that Fort Lauderdale is the "Yachting Capital of the World," the tourism leadership realizes the critical importance of boating and marinas to Fort Lauderdale's economy. Clean environment is also known to be essential for good tourism. Hall of Fame Marina dockmaster Koerber strongly feels that "not returning any boat sewage to the waterway means cleaner recreational waters."

Within a 2-mile radius of Hall of Fame are four other marinas, but only one other pumpout station is available to service the nearly 4,000 yachts and boats kept in or visiting the area.

"We are listed in the Waterway Guide as having a pumpout, and we get people who call to confirm that fact before booking a slip. The public," said Koerber, "respects you for not discharging overboard, and it

shows our leadership [as a business] in environmental consciousness. Westrec wants all its marinas to be proactive, pro-environment, and to show our marina in a good light. We run a clean operation here.”

When Westrec assumed control of the Hall of Fame Marina in 1989, it renovated and upgraded the restrooms and showers along with adding holding tank pumpouts. Good restrooms are rated, in most boat owner surveys, as the feature most wanted, after location of the marina. Inadequate or unclean restrooms are the most common complaint about poor-quality marinas nationwide.

Even though the marina does not sell fuel, it maintains oil spill cleanup gear at the head of its dock. “There have been a couple of instances, when crews were pumping fuel from one tank to another to balance the load, when the receiving tank became full and overflowed into the marina basin,” the dockmaster reported. “Each time we notified the Coast Guard, deployed our oil boom, and had it all contained and largely absorbed before the officers arrived.”

The marina follows Broward County’s best management practices and also requires outside contractors and boat owners/crews to comply. Discharge of sewage is forbidden, and the use of oil bilge pads is encouraged. Recycling is available for oil, batteries, plastic, glass, and cans.

The Marina’s published Services Directory, given to all boaters, contains two sections that spell out what is required: “Subcontractor’s policies and procedures” and “Environmental Policies.” The message is clear: “We operate a clean, efficient facility. We ask that you leave it the same way.”



*Hall of Fame Marina
manager Bob Koerber.*

Equipment source

- Pumpout: Keco, Inc. Pump-a-Head Portable; Keco, Inc., P.O. Box 80308, San Diego, CA 92138.

13. The Hammond Marina

Fertilizing Landscape With Seaweed Saves Money and Environment

Location: 1111 Calumet Avenue, Hammond, Indiana 46320
Telephone: (219) 659-7678 **Fax:** (219) 659-7679
Interviewed: Robert Nelson, Marina Director
Owned by: Hammond Port Authority
Waterbody: Cal River mouth, Lake Michigan

Environmental change

The Hammond Marina reduced its chemical weed control by recycling nuisance seaweed into mulch and fertilizer for landscape plantings.

The second-largest public marina on Lake Michigan

The Hammond Marina is a publicly owned and operated home port marina on Lake Michigan, 14 miles southeast of Chicago and adjacent to the Cal River, which connects to the Mississippi River navigation system. The marina is protected by a double breakwater system that consists of a 14-foot above-water wall and a second submerged wall that minimize wave action. The marina basin contains 1,113 slips and 50 dry-storage spaces, launch ramps, and winter storage for boats. The marina has 12 full-time year-round employees and hires 40 more in the summer boating season, April through November. Bubbler systems protect the marina docks from winter ice.

Boat sizes range from 26 feet LOA to 80 feet LOA (average 33 feet), with 83% between 26 feet and 35 feet. Eighty percent are powerboats and 20% are sailboats.

During the 1995 season, the slips were 70% occupied. On a busy summer weekend, 25% of the boats are used, with 15% occupied overnight. There are 10 liveaboards in the marina.

In addition to slips and land storage, the Hammond Marina offers transient dockage, three public fishing piers, a fuel dock, a retail store, pumpout, laundry, food/beverages, bike rentals, public restrooms, concierge service, a swim beach, and an aquatic resource center. Boats are launched and hauled with a hydraulic trailer.

Concessionaires in the marina provide boat charters, brokerage, a yacht club, and a restaurant/bar aboard the Milwaukee Clipper ship. Available boat maintenance services include fiberglass and hull repairs, engine repair, sail/rigging work, painting, electronic sales/service, welding, and bottom cleaning.

The marina was built in 1991 on an unused urban waterfront. The 54-acre complex was carved out of steel mill slag and shoreline created from dredged sand, which created a mile-long beach of pure sand. The Chicago boat harbors and one in Indiana are within 5 miles and serve a 3,000-boat population.

Management measures

The Hammond Marina achieves the marina management measure for habitat assessment, as well as the measures for marina flushing, water quality assessment, shoreline stabilization, storm water runoff control, fueling station design, sewage facility, maintenance of sewage facilities, solid waste, fish waste, liquid materials, petroleum control, boat cleaning, and public education.

Costs/benefits

In 1995, the Hammond Marina cut its annual \$1,000 cost of disposing of milfoil seaweed to \$200, while also gaining use of it as a mulch and fertilizer for the marina's gardens. That seaweed recycling program projects a saving of \$17,500 for 1996 from a 50% reduction in chemical weed control.

Environmental improvements

The Hammond Marina, like many other freshwater facilities, is plagued with rapidly growing Asian milfoil seaweed. "This virulent plant causes damage to boat engines when it clogs the cooling water intakes," said Marina Director Robert Nelson.

The weed grows to the water surface from roots on the bottom. It grows well when there is plenty of sunlight and nutrients available. Lake Michigan is significantly cleaner due to improved clean marina practices, city sewage treatment, reduced industrial waste, and filter-feeding zebra mussels. However, clearer water has resulted in better milfoil growth and an increased control problem for the marina. As the milfoil grows and is cut by boat propellers, the pieces float off and can take root somewhere else, worsening the problem.

Often during storms and after annual chemical treatment, the milfoil breaks off to form large floating mats, which drift around the marina getting trapped in slips. The milfoil is chemically treated with sonar pellets, which had cost the marina \$35,000

including labor per season to apply. Cleaning the floating milfoil is a continuous task and in a typical year marina staff would remove 200 cubic yards of the weed, which had to be trucked away to the landfill.

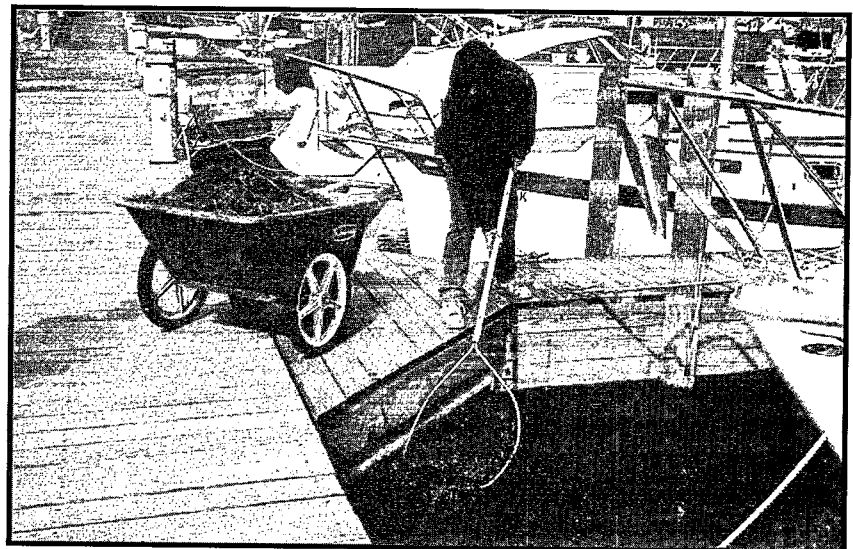
"In 1995 we began recycling the seaweed as an organic resource, rather than taking it to a landfill. The milfoil is gathered and used as a high quality fertilizer/mulch on flower beds," said Nelson.

"Additional quantities are used in local parks and by local landscape supply stores, which give it to customers. Gardeners now come to the marina for free bags of the seaweed."

"As a government facility, this saves the marina money and time tending to ornamental flowers and trees. During the 10-week season, the weed-harvesting costs are level, but the disposal costs had been up to \$100 per week for an annual total of \$1,000. But it now costs us only \$20 per week for workers to bag and mulch with the weed, for a 1995 total cost of \$200." With the 1995 harvesting success, Nelson expects to halve the amount of weed-killing chemicals the marina used and thus realize a 50% cost saving in 1996.

"We use a special hook rake, invented by our staff, to harvest the seaweed. Boaters also help by placing the milfoil on the docks, where we pick it up."

Harvesting Milfoil seaweed for recycling into landscape plantings. (photo by The Hammond Marina)



The Hammond Marina takes pride in its beautiful park-like landscaping. "The public sees flower beds with amazing blooms," said Nelson. "In 1994 marina staff planted over 800 bulbs in the fall along the entranceway, near the main comfort station, the fish cleaning station, and other areas. Additional plantings are done for summer blooms."

Other improvements and benefits

"The Hammond Marina does all the right stuff: recycling of engine oil, aluminum, glass, and paper with recycling bins on the docks. We use the money from recycling for our disabled sailing program," Nelson said. The Hammond Adaptive Sailing Program teaches able and disabled

persons how to sail and offers them an opportunity to socialize with people who share the same interest.

Hammond constructed a mini-beach adjacent to the marina on abandoned property, resulting in

cleaning of 2 acres of waterfront that had been a major source of refuse and flotsam and jetsam litter. The cleanup cost the marina \$2,000. Now the general public and boaters have lake access and swimming beach use.

Runoff from the parking lots is buffered with lawn edges. Shoreline erosion and internal waves are controlled with sloping riprap stone bulkheads.

"In addition to our pumpout station on the gas dock," Nelson wrote, "we added in 1994 a portable pumpout to take the service to boats in the slips. The portable cost \$4,700, and had \$1,500 in labor and parts. Boaters—especially on larger boats—have consistently complained about having to untie just to go to the gas dock for pumpouts. Additionally, and very importantly, when our main pumpout system is

inoperative (such as for maintenance), the portable one is available. Between Memorial Day and Labor Day 1995, the portable earned \$4,500 additional income primarily from slip holders in the marina. Many of them get pumped out even though their tank is only half full." Each pumpout costs \$10 when done in the slip, but at the fuel dock the cost is \$5.

One of the unique and highly successful environmental and educational initiatives at the Hammond Marina is a work-study program with a City of Gary social service agency. Called Pyramid, this summer program provides and pays 20 teenagers to help clean up the marina and beach at minimum wage. "The teens also do a good job mulching with the seaweed and weeding our gardens. Now our public areas are kept much cleaner on a 3-times-a-week basis. Customers appreciate the extra service on docks," said Nelson.

"This is a unique summer job program and is the only one I know of that is related to the harbor. A professor at Purdue University, who is an avid boater, runs the program. They target kids who could otherwise get into gangs. The teens get training in boating, boating safety, and boating economics. A future benefit may come as these teens contemplate boater success stories, and consider possible vocations in boating businesses," Nelson added. "This is an excellent source for additional boater services. I recommend that other marina managers check their local government and private foundations for similar help."

Marina director Robert Nelson has many years of prior experience as chief of all boating facilities in Chicago, and he has been active nationally in NASBLA and SOBA. His experience, enthusiasm, and innovation are serving the Hammond Marina very well. His motto is "Our service must exceed our customers' expectations." He added, "We look for employees who know how to treat people." And obviously how to run a clean marina, too.

"In 1995 we began recycling the seaweed as an organic resource, rather than taking it to a landfill. The milfoil is gathered and used as a high quality fertilizer/mulch."

14. Harbour Towne Marina

Filtered Pressure Wash Water Kept Business

Location: 801 Northeast 3rd Street, Dania, Florida 33004
Telephone: (305) 926-0300 **Fax:** (305) 922-5485
Interviewed: Gary Groenewold, Florida Regional Manager
Owned by: Westrec Marinas, Inc., Encino, California
Waterbody: Dania Cutoff Canal, off Intracoastal Waterway

Environmental change

This marina invested in a wash-down filtration system and relocated its hull-cleaning area for environmental compliance.

The full-service and dry stack marina

Harbour Towne Marina is a full-service marina with 150 slips, 365 racks in two large buildings, and 35 dry-land spaces for boats. It operated at 100% of capacity in the 1995 boating season and has 35 full-time employees year-round. Of the boats kept in slips, only five are liveaboards. Ninety-five percent of the boats kept in the marina are powerboats. The boats range in size from under 21 feet up to 80 feet; the average sizes are 45 feet in slips and 24 feet in racks. The largest boat is a 200-foot LOA commercial gambling ship that takes daily cruises offshore.

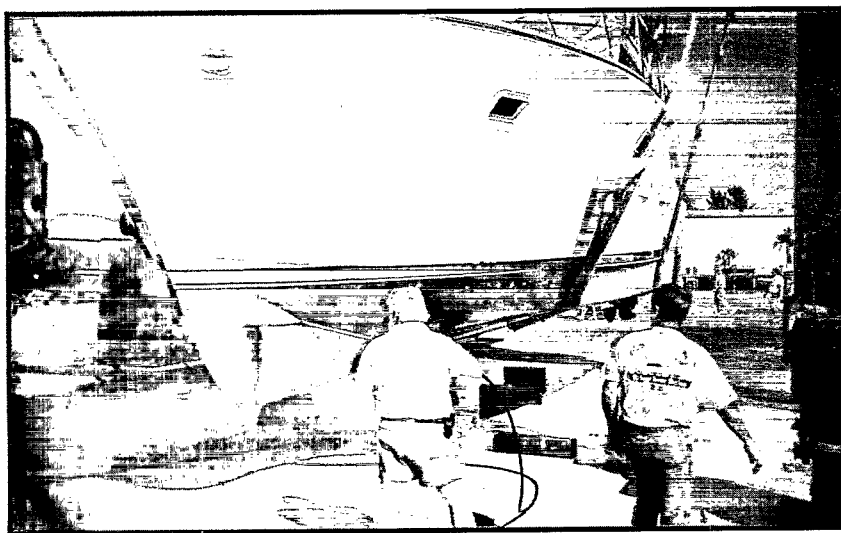
Before becoming a marina in the 1950s, the land had been used as a U.S. Coast Guard Station since the early 1940s. Westrec purchased the facility in 1989 and has been operating it since. Some services, shops, and offices are leased to other boating-related businesses.

Among the other services available to boaters are transient dockage, launch/haulout, boat rentals, charter boats, new and used boat sales, retail store, fuel dock, pumpout, laundry, food and beverage, and repair services (concessionaires) for fiberglass, hulls, engines, sails, rigging, paint, canvas, electronics, and welding. Westrec does all boat hauling and launching with a travel lift and forklifts. Harbour Towne is the international headquarters of Club Nautico, a small boat rental franchise business. A newly renovated dockside restaurant helps make Harbour Towne a fine marina.

Within a 2-mile radius there are eight other marinas and five boat/shipyards, all servicing an estimated population of 4,000+ recreational vessels. While South Florida has year-round boating weather, the peak season starts in October and runs through April.

Management measures

Harbour Towne Marina achieves the marina management measures for storm water runoff control and solid waste, as well as shoreline stabilization, fueling station design, sewage facility, maintenance



*Harbour Towne Marina's
30' by 60' hull power-
washing pad.*

of sewage facilities, fish waste, liquid materials, petroleum control, boat cleaning, and public education.

Cost/benefits

Design, permit, equipment, and labor costs to build a wash-down pad away from the launching well, as well as a power wash water filtration system with wastewater returning to the sewer, required an initial outlay of \$46,415. Annual operation and

maintenance of the wash-down area, including sludge removal, costs \$3,300. Gross annual revenue from hauling and washing boats was \$270,000. Assuming a 5%

discount rate with costs amortized over 10 years, average annual net income from the hauling/washing operation is estimated to be \$260,689.

Environmental improvements

Broward County required Harbour Towne Marina, particularly the boat wash-down area within the working boatyard, to comply with its best management practices or to close down that part of the business,

with a potential loss of almost \$300,000 annually. Permits and design plans cost \$3,415. To reduce the chance of spray and bottom debris reaching the marine waters, the washing pad was relocated 100 feet inland from the travel lift well used for haulouts. When the new pad and filtration system were being built, an unanticipated abandoned foundation had to be removed, and a storm water drain tie-in was built (\$25,000). Westrec installed a Nova Chem wastewater filtration system (\$18,000) to clean the power wash water sufficiently to meet the county's gray water standards for discharge into the municipal sewer system. The project was completed in the spring of 1993.

The system is turned on whenever power washing is being done. The 30-foot by 60-foot concrete washing pad slopes down from the four sides to a large central drain. The pad is hosed down after each hull is cleaned, and all debris and dirt go into the drain and filters. A small mesh cage traps the big pieces of marine growth. The water with dissolved and small particles is pumped into the filter system, where it is further filtered and treated with a series of three different chemicals. Finally, the water leaves the filter and enters a sewer drain. It costs \$3,300 to operate and maintain the wash-down area, including sludge removal, chemicals, and labor.

When asked what he would do differently, Groenewold said, "I would research the site better. For a smaller yard, I would tailor the system to the site and lower the cost by using plastic tubs instead of stainless steel tanks."

When it rains in South Florida, it really pours, and such a volume of runoff could not be allowed to enter the filter. Since the pad is always kept clean, contamination of runoff is not a problem. Thus, a drain bypass system was installed to allow rainwater to drain into the adjacent mangrove swamp.

During the 1994-95 season, Westrec hauled and washed 650 boats, which

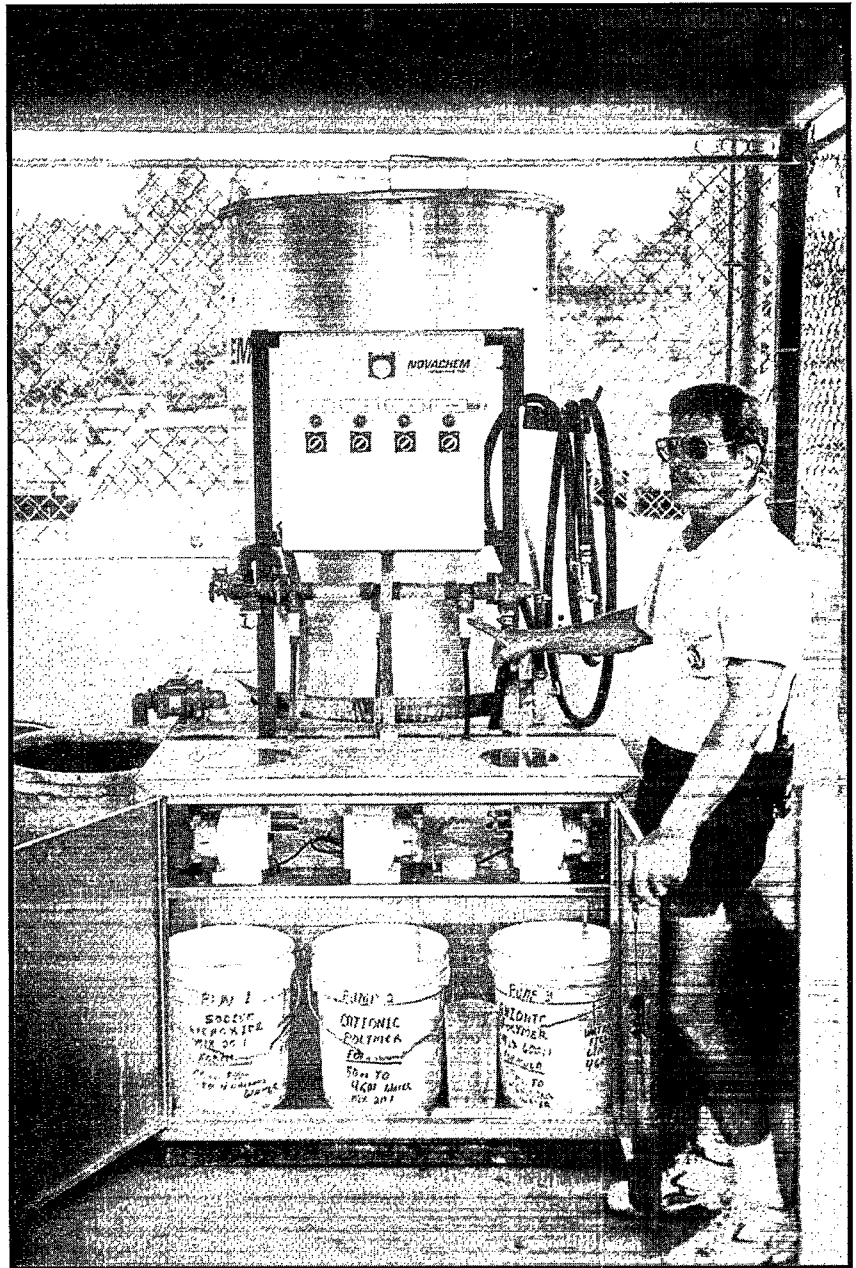
**"More than any other thing
the marina can do, we can
keep wash water from
returning to the canal."**

brought in \$270,000 income. Groenewold added, "We couldn't be in the boat-handling business without approval for our new pad and filtration system. We could not allow contamination to continue. More than any other thing the marina can do, we can keep wash water from returning to the canal."

The marina employs a number of other best management practices consistent with the Broward County BMPs. "Copies are given to all outside contractors and commercial tenants with contract language requiring their compliance," said Groenewold, "and the contractors must each agree to the terms and sign the contract before doing any work on our property. Discharge of sewage is forbidden, and the use of oil bilge pads encouraged. Recycling is available for oil, batteries, plastic, glass, cans, zinc, and other metal scraps. Signs and a fish-cleaning station also are found in Harbour Towne. Every boat owner gets a two-page 'Environmental Awareness Contract' stating the marina's requirements on sewage discharge, bilge water, fuel, and boat maintenance, and a hurricane preparedness plan." The latter is an interesting inclusion because severe storms can do much physical damage, which results in environmental contamination. At Harbour Towne, storm and environmental preparation go hand in hand.

The fuel and pumpout dock were recently modernized, and extra fire and spill control equipment was added. Boaters are required to have oil absorption pads in the bilge. Pumpouts are free for slip customers, and a \$5 fee is charged for outside boats. Hand washing of vessels is permitted in slips only if biodegradable soap is used in minimal amounts.

To further reduce runoff contamination, the entire perimeter of the marina (except the launching areas, commercial work building frontage, and fuel dock) was dug up and planted with a greenbelt of grass. Grassy traffic islands with trees were built in the large car parking lots. The green



foliage and lawns help ease the visual impact of the large facility, act as runoff filters, and give some cooling effect from otherwise fully paved though very clean land.

This power-wash water filtration, clarification and flocculation system allows Harbour Towne Marina to discharge the greywater into the municipal sewer system.

15. Kean's Detroit Yacht Harbor

Urban Marina Has Pumpout/Fuel Sales Synergy

Location: 100 Meadowbrook Ave., P.O. Box 14189, Detroit, Michigan 48189-0189

Telephone: (313) 822-4500 **Fax:** (313) 822-5442

Interviewed: John Kean, CMM, Owner and General Manager

Waterbody: Detroit River, below Lake St. Clair, facing Canada

Environmental change

Four full-serve pumpout stations, which can service every boat tied in eight fuel docks, attract new customers who also buy fuel.

The urban marina

Kean's Detroit Yacht Harbor is a private commercial, seasonal business that is considered a home port for its customers, although it is also a popular stopoff for transient boaters. Within a 2-mile radius nearly 1,000 boats are kept in eight other marinas and yacht clubs.

Kean's and the subleased boat services have a combined payroll of 40 full-time employees year-round plus 10 part-time in the boating season. The business has a summer season storage capacity of 330 boats in slips and 50 on land; its winter indoor and outdoor land storage is 525 boats. Boat sizes range from 22 to 46 feet with the average at 31 feet. Other services and profit centers include transient dockage, launch/haulout, used boat brokerage, retail store, bait/tackle sales, food/beverage/ice sales, and laundry. A significant retail market for Kean's is Canadians who cross the river to buy alcohol, cigarettes, and

gasoline at lower prices; many also get pumped out. On a busy summer weekend about 15% of the boats would be used, half of which would have people sleeping aboard overnight.

The full-service marina was first built in 1931 by Marvin Kean and was bought by his son, John, in 1980. Winter inside and outside boat storage and boat repairs have always been an important part of the business. Boats are hauled by an Algonac sling lift on rails and moved with a hydraulic trailer, forklift, and crane. Trained technicians repair paint, fiberglass, engines, canvas, and hulls.

Management measures

Kean's Detroit Yacht Harbor achieves the marina management measures for sewage facility and maintenance of sewage facilities, as well as shoreline stabilization, storm water runoff control, fueling station design, solid waste, liquid materials, petroleum control, and public education.

Costs/benefits

Kean's Detroit Yacht Harbor, for a capital cost of \$12,000 in 1990 and an annual operational/maintenance cost of

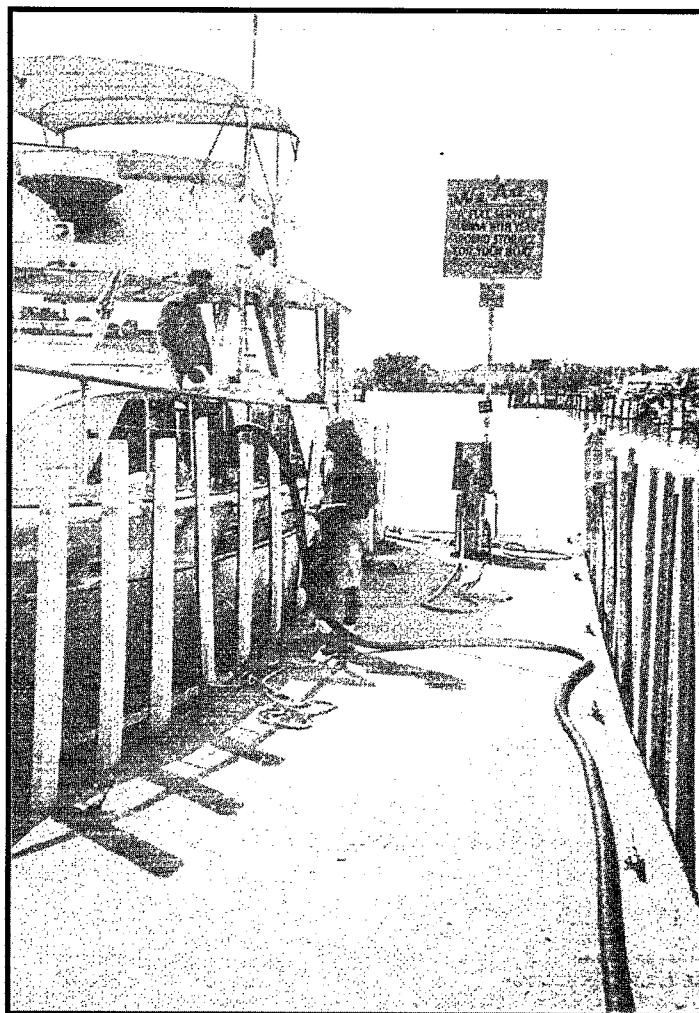
\$1,040, last year grossed \$3,000 in pumpout income plus an additional \$8,000 in fuel sales, as a result of providing convenient, one-stop, staff-operated (full-service) pumpout service at the boat fueling station, bringing a gross \$8,400 income to the business this year.

Environmental improvements

Because the marina is located on a no-discharge waterway, owner John Kean feels that providing pumpout service is an essential responsibility of his marina and other large marinas. At the Detroit Yacht Harbor, pumpout service was first made available in 1975 with a pumpout cart that was pulled to boats in slips. The cart was then emptied into a connector to the city's wastewater treatment system. But the mobile service was labor-intensive, slow, and not as well used by boaters as expected.

To make the sewage pumpout service more efficient, convenient, and cost-effective, Kean installed a fixed system at his fuel docks in 1990. A commercial 200-gallon vacuum tank, located on the inland side of his office/retail building, pulls sewage through 120 feet of underground 2-inch vacuum lines from four dockside fuel stations, each with on/off switches, to the vacuum tank. When the tank nears full, the vacuum tank automatically cycles from vacuum to a pressurized tank, which blows the effluent into the marina's outgoing sewer line to the city's system. Once empty, it automatically reverses its valves and again builds a vacuum. Indicator lights on each dockside pumpout post indicate whether the system is on vacuum and available for use, or on pressure and emptying.

In 1994, the marina provided over 1,200 pumpouts, charging \$5 per pumpout to Kean's seasonal slip customers and \$10 to outside boaters. "As part of our marina marketing package, we offer discounts to our slip customers of 50% per pumpout and 15% off gasoline sales," said John Kean,



"and we are 95% occupied for the 1995 summer season. The pumpout income is almost 100% profit, and the extra fuel sales net about \$0.30 per gallon sold."

"One key to our success," said Kean, "is having our fuel dock staff do each pumpout. Despite having six other do-it-yourself pumpout stations within 2 miles of our docks, we attract boaters to our service because it is an easy and quick pumpout. Customers only want to dock their boat once. That's why we put the pumpout on the fuel dock. The pumpout only takes 15 to 30 seconds to empty the holding tank, and (contrary to what some marina managers fear) does not slow our boat-fueling operation."

Staff-operated pumpouts boosted gasoline and diesel sales at Kean's convenient fuel dock. (photo by Kean's Detroit Yacht Harbor)

"But I do not believe that our pumpout service has improved water quality," lamented Kean. "We are one-third mile downstream from Detroit's sewer plant outfall. When it rains, the city's combined storm water and sewage system dumps raw sewage into the river. However, I do believe

"Our key to success is having our fuel dock staff do each pumpout."

that we have a synergistic fuel/pumpout business advantage which complies with Michigan's strictly enforced no-discharge law and ban on Y-valve use."

As part of John Kean's ongoing process of strengthening his marina business, he has made many other environmental improvements in recent years. Remodeled and improved restrooms are well used and appreciated by customers. Along with the pumpout service, the gasoline-only fueling operation has been upgraded and has spill control gear at the ready. Boats kept in the marina now use oil absorption pads in bilges. Oil, cans, bottles, and batteries are recycled. Kean's earns \$5 for each battery turned in. Clean boating educational efforts include articles in three newsletters per year, new signs, and contract language. Dog owners have a designated grassy area to walk their pets. Only dustless sanders can be used in the marina. Grass and planter beds buffer the river from parking area runoff.

Well-placed and well-maintained grass, flowers, shrubs, and trees make this facility seem less urban. A nicely decked swimming pool, jacuzzi, and changing rooms also make Kean's a popular oasis in an otherwise unattractive section of Detroit.

Equipment source

- Vacuum pumpout unit: Tank Truck Services, 25150 Dequindre, Warren, MI 48091.

16. Lockwood Boat Works, Inc.

Recycled Crushed Concrete Controls Runoff, Saves Money

Location: 1825 Highway 35, Morgan,
South Amboy, New Jersey 08879-2525

Telephone: (908) 721-1605 **Fax:** (908) 721-2740

Interviewed: William J. (Bill) Lockwood, General Manager

Owned by: William V. and Mary Lockwood

Waterbody: Raritan Bay

Environmental change

Parking areas and the boat maintenance yard were covered with 6 inches of crushed concrete to control runoff at this New Jersey boat works.

The full-service marina and boatyard

Lockwood Boat Works, Inc., celebrating its 50th anniversary in 1996, is a first-class, full-service marina and boatyard owned and operated by the Lockwood family. It has 200 slips in 2 adjacent marinas—150 slips in the main facility and another 50 slips at the small Old Spye Marina just east and about 1,000 yards down channel, bought in 1995.

At the main yard, land storage is available for the winter season and boat repairs. Launching and hauling are done with a combination of two 35-ton open travel lifts. Full repairs, available in heated shops, include fiberglass, wood, hulls, engines, sail rigging, painting, and welding. A fuel dock and pumpout are available.

Up the hill, on Highway 35, Lockwood has a first-class retail ship's store with a full

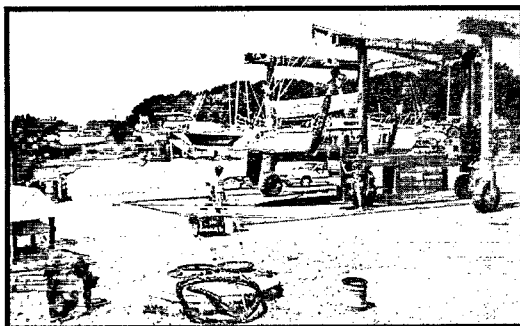
line of accessories, boat equipment, hardware, and used brokerage. Their sales motto is "If we don't have it, we'll find it for you."

Considered a home port by its boaters, there were a few liveaboards during the 1995 summer season with two remaining over winter. On a busy summer weekend, about 50% of the boats are used daily and about 20% overnight.

At Lockwood the boats range in size from 16 to 45 feet LOA, with the average between 28 and 35 feet LOA. In 1995, the slips were 100% occupied during the boating season, which runs from May 1 through the end of October. Sailboats make up 75% of Lockwood's boat population; 25% are powerboats.

The marina was begun in 1946, following World War II, by William V. Lockwood. He started by building some docks, from which he rented and sold wood skiffs he built. Gradually, the business grew into a full-service marina, now run by his 10 children. Today, three generations of Lockwoods are working in the marina, boatyard, and retail businesses. William J. (Bill) is the general manager.

Lockwood Boat Works power-wash pad, work yard, and parking areas covered with recycled crush concrete.



Within 2 miles, there are three other marinas, ranging in size from 50 to 300 slips, with a combined population of almost 800 boats. Lockwood Boat Works' slip rates are similar to those of the neighboring facilities.

Management measures

Lockwood Boat Works achieves the marina management measure for storm water runoff control, as well as the measures for shoreline stabilization, fueling station design, sewage facility, maintenance of sewage facilities, solid waste, fish waste, liquid materials, petroleum control, boat cleaning, and public education.

Costs/benefits

Lockwood Boat Works installed 10 acres of crushed concrete in 1995 for a permeable, runoff-controlling yard surface at a cost of \$18,000 per acre installed. By using a recycled product instead of blacktop paving, the marina saved \$36,000 (a 67% saving) per acre. Assuming that the cost will be amortized over 20 years, Lockwood saved \$14,444 in 1995 alone.

Environmental improvements

Instead of paving its parking areas and boat work yard, Lockwood Boat Works covered the entire 10 acres with a 6-inch layer of crushed concrete, a recycled product available from a local sand and gravel company.

This type of surface was selected over paved blacktop for two types of reasons: ecological and economic. Lockwood said, "I wanted something which would absorb rain, significantly reduce runoff to comply with federal guidelines for marinas, and help control erosion. Also, paving would have cost \$54,000 per acre installed, or three times more than the \$18,000 per acre cost to install the crushed concrete."

"Crushed rock was also considered, but it had two disadvantages over the concrete: cost and slow stability. The cost of crushed rock would have been \$27,000 or one-third higher. The concrete stone was stable enough to drive trucks on it immediately after being spread, whereas 6 inches of crushed stone would have taken many weeks to settle before it would hold a truck's weight. And another benefit from using crushed concrete was that we used a recycled product, and that reduced the volume of waste concrete going to the landfill."

"At the same time, we built retaining walls on the hillside to reduce erosion and the need for maintenance dredging. We want to clean everything up so we will be able to stay in business with a clean operation."

Other improvements and benefits

Lockwood Boat Works runs a very clean and unusually neat boatyard. A major part of keeping clean is educating customers and employees. Before any boat is worked on outdoors, a plastic tarp is placed on the ground under the hull to catch any falling debris and dirt. Every day during boat repairs each tarp is swept or vacuumed clean. "We have been using drop cloths beneath our outdoor boat work for 4 years, and it works well," said Bill Lockwood. "Next year we are going to try 18-foot-wide filter fabric instead of tarps under every boat placed in winter storage."

One unique and effective approach used by Lockwood is its practice of placing two

"I wanted something which would absorb rain, significantly reduce runoff to comply with federal guidelines for marinas, and help control erosion."

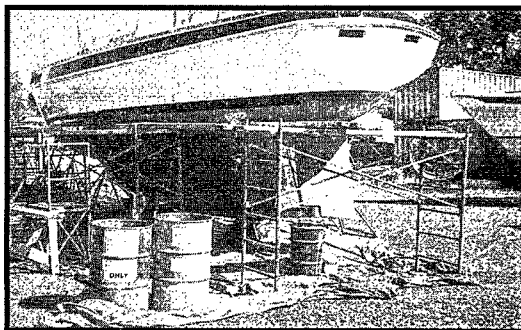
55-gallon drums beside boats being worked on by staff or boat owners. Both barrels were painted with attractive vinyl signs by Screen Graphics of Florida. The gray barrel has two red-lettered vinyl signs: "Garbage Only" and "NO Recyclable Items." The other is painted blue with one large vinyl sign:

Commingled Recyclables ONLY

- * Aluminum Cans
- * Glass Bottles & Jars (Green, Brown, Clear)
- * Metal Cans
- * Plastic Beverage Containers

To further protect the environment, Lockwood uses a variety of clean marina practices.

- Staff and customers are required by contract to use only dustless sanders. "We have Fein vacuum sanders and a range of sandpaper discs available. The sanders rent for \$15.00 per hour, plus disc cost. But if they buy their bottom paint from us, we give them the first 4 hours' use free."
- Used fuel filters, paint thinners, acetone, and other chemicals are picked by commercial services, which recycle or dispose of each and provide the marina with a statement of disposal.
- Aboveground, lined diesel and gasoline fuel tanks have replaced old, in-ground tanks.
- Scrap metal from boat and mast repairs is collected in a 30-yard bin, then hauled to a local scrap metal dealer and sold.
- Old wood beams, cradles, and blocking are cut up and placed for customers to take home for firewood. "It goes real fast," said Lockwood.
- Hulls are washed down on a paved asphalt pad, set about 25 feet inland from the travel lift well. This is the only place boats are high-pressure-washed. Wash water all runs into a centered drain that empties into a precast cement, in-ground settling



Tarps placed beneath a boat being worked on to catch dirt and debris. Two 55-gallon drums are provided for rubbish and recyclables.

tank. When the tank becomes nearly full, it is pumped out into a 55-gallon drum that contains a filter cloth bag. The filtered water runs out of holes in the barrel and into the ground. While showing a dry handful of the paint chips and debris collected in the bag, Bill Lockwood exclaimed, "Just think—in the past all this dirt ran into the marina waters!"

- Every marina customer gets a two-page environmental practices and rules statement. It describes the need for drop cloths under all yard work and provides practices for disposal of paint cans and toxic waste, bilge pumpout, fish cleaning, spring launching, and holding tank pumpout. "Our goal is to provide a safe and clean environment for your power and sail boating pleasure, and at the same time protect the environment around us."

"I feel good about the improvements we have made," said Bill Lockwood. And so he should as his family celebrates their first half-century serving the boating public. With 100% occupancy, customers clearly agree that Lockwood Boat Works has become a clean marina that should have another 50 years of business success.

Equipment sources

- Vinyl signs: Screen Graphics of Florida, Inc., 2801 Northwest 55 Court, Fort Lauderdale, FL 33309.
- Dustless sander: Fein-Vac; Fein Power Tools, Inc., 3019 West Carson Street, Pittsburgh, PA 15204.

17. The Lodge of Four Seasons Marina

Dustless Sanding Increases Productivity

Location: Highway HH, P.O. Box 215, Lake Ozark, Missouri 65049
Telephone: (573) 365-8540 **Fax:** (573) 365-8547
Interviewed: Clay Huntress, Manager, CMM applicant
Owned by: Chase Resorts, Inc.
Waterbody: Lake of the Ozarks

Environmental change

This Missouri marina converted from conventional sanders to dustless vacuum sanders.

The inland lake resort marina

Lake of the Ozarks, in central Missouri, is an inland private lake owned by the Union Electric Company. More than 70,000 boats are docked around the lake, and there are two state parks.

The Lodge of Four Seasons Marina has 25 full-time and 5 part-time employees during the boating season (March through November) and 10 full-time employees year-round. This private commercial business is a full-service marina/boatyard considered a home port by its customers. The marina has 148 covered and 71 uncovered slips, with an average berth size of 44 feet. Over 90% of the slips were leased for the 1995 season, with boats remaining year-round in water. About 20% of the boats are sailboats and 80% powerboats, and they range in size from 21 feet up to 54 feet, with 146 vessels in the 41- to 50-foot size

range. On a busy summer weekend, up to 40% of the boats are in use or occupied, with about 35% occupied overnight.

In addition to slips, the marina offers transient dockage for visitors from around the 95-mile-long lake. The boatyard does haulout and launching; full-service repairs to fiberglass, hulls, and engines; sail rigging; painting; electronics; and welding. Boats are moved with a travel lift, hydraulic trailer, and forklift.

On a no-discharge lake, Four Seasons has a pumpout on the fuel dock that was used about 1,000 times during the 1995 summer. Pumping is done by marina staff. Within a 2-mile radius of Four Seasons, there are four other marinas that also offer fuel and pumpout. There are about 3,000 recreational boats in the area.

On the retail side, the marina's profit centers include boat rental/charters, used boat brokerage, retail store, bait and tackle, fuel, food, drinks, and ice. The marina is part of the Lodge of Four Seasons resort, which also has 4 restaurants, a hotel conference center, a campground, 4 pools, a swimming beach, 3 golf courses, 23 tennis

courts, a bass fishing guide, parasailing, a racket club with fitness center, and other amenities common to a major resort.

Management measures

The Lodge of Four Seasons Marina provides for the collection of solid waste, and achieves the marina management measures for shoreline stabilization, fueling station design, sewage facility, maintenance of sewage facilities, liquid materials, petroleum control, boat cleaning, and public education.

Cost/benefits

The marina invested \$3,724 to convert from conventional sanding to a dustless vacuum sanding system. The new system captures over 99% of the dust and has increased productivity of bottom work, lowered material cost, and decreased cleanup labor by 30%. The dustless hull maintenance service brings \$20,000 of annual gross revenue to the marina, and saves \$6,050 annually in materials and labor costs compared to the marina's past sanding practices. Net income from the hull services is estimated at almost \$12,000 per year.

Environmental improvements

"Spring bottom painting is an important profit center at Lodge of Four Seasons Marina, responsible for about 6% of its annual boat repair income. No private outside contractors or do-it-yourselfers are allowed to do bottom work here as part of the contract signed by our customers. Because of national concern about clean water," said marina manager Clay Huntress, "I was concerned about the amount of dust getting into the atmosphere, land, and eventually the lake during hull sanding."

"In the spring of 1995, we bought two portable Fein dustless sanders, which allow four sanders to work at the same time,"

Huntress explained. "The two electric machines cost \$3,724 plus filters. I was amazed at how well they worked. Over 99% of all the dust is vacuumed up and never gets into the environment. We can run two sanders at the same time off each vacuum unit."

"In fact, we are doing each boat faster, cutting 30% off the time typically spent doing the bottom in the past," said Clay. When the machines first arrived, Clay and his yard foreman set up a side-by-side comparison bottom sanding test using two identical 52-foot Bluewater cruiser-type houseboats. One hull was sanded the traditional way with rotary sander and dust flying about; the other was done with the dustless sander.

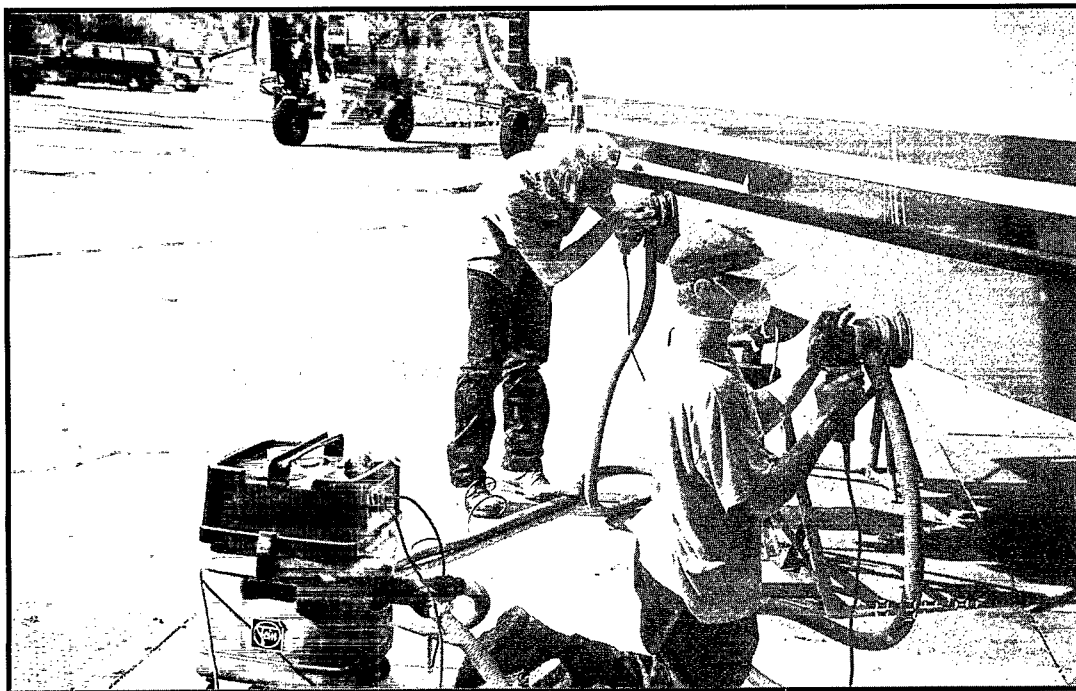
"The old style sanding job took 18 hours of labor, while the new sander took 12 hours of labor," said the foreman. The marina has now found that it saves about \$205 per average boat bottom painted and fills about one filter bag per boat. Clay did add, "Boats here don't need to repaint their bottoms every year or two, as on saltwater. We only need to haul and paint ours about every 3 or 4 years." (Note: Zebra mussels are not in the Lake of the Ozarks—yet.)

"Without any dust we have a cleaner, safer working environment," Clay added. "Very little paint dust is left in the painting bay when the job is complete. My workers don't have to wear full coverall suits with respirators, and they work quicker with fewer breaks. Lighter clothing can be worn, with just goggles and masks required to do the job. The employees really like this equipment. This way it's easier to keep good health; it could possibly reduce workers' compensation claims."

"Since most sanding and painting is done indoors, we also save labor costs by not having to cover/uncover the boat to keep the topside clean. The average boat

"Because of national concern about clean water, I was concerned about the amount of dust getting into the atmosphere, land, and eventually the lake during hull sanding."

Marina workers sand the bottom of a powerboat with a dustless sander. (photo by Lodge of Four Seasons Marina)



takes 2 to 4 hours to cover. The customers like having cleaner boats, too. I estimate 90% labor saving in area (ground) cleanup," said Huntress.

"Another cost saving comes from using fewer sanding disk pads. Reviewing other jobs over the past 2 years of sanding and painting reflected an average use of old style disks at 43 per job, while the new style averages 38 disks. Since the vacuum pulls cool outside air into the holes in the center of the random orbital rotating disk, the sandpaper stays cooler, does not melt the paint or gelcoat (common with other spinning sanders), slows pad build-up, and lasts longer. I just couldn't recommend dustless sanding highly enough."

The marina contracts out to a private company, Safety Kleen (a nationwide service), to pick up its used solvents and oil, and maintain the parts washer, for about \$135 per month. "With hazardous waste disposal a long-term problem for all of us, I wanted to go with a respectable national company for this service. They keep all our records of disposal at a reasonable fee to the marina."

"Our fuel dock has six pumps, with four for gasoline and two for diesel. We sold 150,000 gallons during the 1995 boating season," said Huntress. "We have a written spill prevention, control and countermeasure (SPCC) plan developed for us by a registered environmental engineer. In addition, we automatically put oil-absorbing pads in any bilge of any boat when we see the need."

Dustless sanding, hazardous waste removal, fuel SPCC, and bilge oil pads help the Lodge of Four Seasons comply with its NPDES permit.

Equipment sources

- Dustless sander: Fein-Vac I, 10-gallon; Fein Power Tools, Inc., 3019 West Carson Street, Pittsburgh, PA 15204.
- Hazardous waste removal: Safety Kleen, Inc., 1000 North Randall Road, Elgin, IL 60123-7857.

18. Oak Harbor Marina

Floating Pumpout/Restroom Provides Easy Access for Boaters

Location: 8075 Catalina Drive, Oak Harbor, Washington 98277

Telephone: (360) 679-2628 **Fax:** (360) 240-0603

Interviewed: David D. Williams, Harbormaster

Owned by: City of Oak Harbor

Waterbody: Oak Harbor Bay, Puget Sound

Environmental change

Oak Harbor Marina purchased a floating restroom barge, which has both a pumpout and a dump station, to service the guest dockage area.

The marina

Oak Harbor Marina—city owned and operated—is the only recreational boat marina in the bay. Its sign says: “Welcome to OAK HARBOR MARINA, a marine park for use by the general public.”

The marina has 133 open and 183 covered floating concrete slips, plus 96 dry-storage, garage-type sheds on land slips, and it had leased out 94% of its 316-slip capacity for the 12-month season. Four full-time employees work year-round, with three part-time hires in the summer season.

The boat mix is 40% sailboats and 60% powerboats, ranging in size from 24 feet up to 50 feet (average 36 feet). Twenty-five vessels are liveaboards. On a busy summer weekend, the manager estimates that 90% of the boats are used in this home port marina. A privately owned and operated fenced-in dry-storage yard is available for up to 40 boats on trailers or blocks.

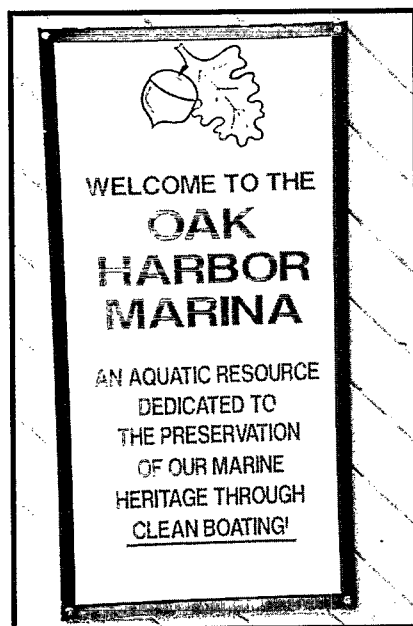
Transient guest moorage (dockage) is available for up to 100 more boats, 38 of

which are along the floating breakwater’s walkway, where boats up to 40 feet LOA can tie up. The breakwater is a Wave Guard offset floating breakwater built of concrete and wood by Bellingham Marine Industries. The design includes double-wide slips along the lee side and allows people to use the offset wide surfaces as deck patios. The 10.5-foot depth and twice-daily 13-foot tidal range made the floating breakwater practical for wave protection.

Other services include launch/haulout with a hoist crane and a 100-foot-wide launch ramp, engine repair, floating fuel dock with pumpout and dump station, and ice sales. The Oak Harbor Yacht Club is located in the marina and has 300 members. Amenities for boaters in and around the marina include recently renovated restrooms, picnic tables, children’s playground, barbecue area, volleyball, horse-shoes, and a city park. Just a short walk away are the city’s shops, motels, and restaurants.

The marina was built in 1974 and expanded its guest moorage in 1988 with the installation of the floating breakwater. Income from the marina goes into a city enterprise fund dedicated to the facility’s operation and maintenance. “We are not a fishing port. Our marina is 98% pleasure

Welcome sign gives an environmental greeting to all visitors at Oak Harbor Marina. (photo by Oak Harbor Marina)



craft. This waterfront had previously been a Navy base since 1942. For most of the century prior to 1942, there was nearby a commercial dock for transshipment of goods and merchandise," said David Williams, "but the dock burned in the early '60s and has not yet been replaced."

Management measures

Oak Harbor Marina achieves the marina management measures for sewage facility and maintenance of sewage facilities, as well as marina flushing, water quality assessment, habitat assessment, shoreline stabilization, storm water runoff control, fueling station design, solid waste, fish waste, liquid materials, petroleum control, boat cleaning, and public education.

Costs/benefits

Oak Harbor Marina's cost to design and build the floating pumpout/dump station/restroom barge was \$58,600, paid with a Washington State grant. Annual operating and maintenance costs were \$2,990 in 1995. No pumpout use fee is charged, but the funds come from the marina maintenance account. By adding the floating

station, the marina avoided costs equivalent to \$8,220 for commercial septic haulout service. However, since the city handled septic services, exact avoided costs are not known.

Environmental improvements

Water-Loo is the name given to Oak Harbor Marina's anchored barge with pumpout/dump station and twin restroom, which cost \$58,600 to design, build, and install. The Washington State Parks and the Interagency Committee for Outdoor Recreation (another state agency) gave the City of Oak Harbor a \$58,600 grant, which paid for the floating self-serve service station. The barge was manufactured by the Impero Construction Company, Bellingham, Washington, and operated under license from the American Eagle Manufacturing Company, LaConner, Washington.

Annual operating costs are \$795 for labor, \$975 for supplies, and \$1,220 for parts and are paid out of the marina maintenance budget. While all pumpouts are free to encourage maximum use, "The city believes that the annual costs are offset by improved water quality. I feel it [the barge] is a very significant environmental enhancement," said Harbormaster Williams. "As a municipal marina, we don't deal with profit/loss in the same way [as private marinas], or at least we don't have the records to prove the impact of environmental compliance."

The anchored aluminum barge has two unisex toilets, which look like aluminum outhouses or water closets (WCs) at each end. The larger WC is in compliance with the Americans with Disabilities Act (ADA). Near the middle of the barge are two SeaLand pumpout stations, accessible to boats that tie up on either side, and a hand wash sink. Beside the smaller WC is the portable toilet dump with a wash-down hose attached (typical for dump stations) for convenient clean up. The barge contains a 3,000-gallon holding tank that is

emptied an average of one to two times per month in season. The fuel dock has one Edson pumpout and dump station available with a second to be added in 1996. All pumpouts are self-serve by boaters.

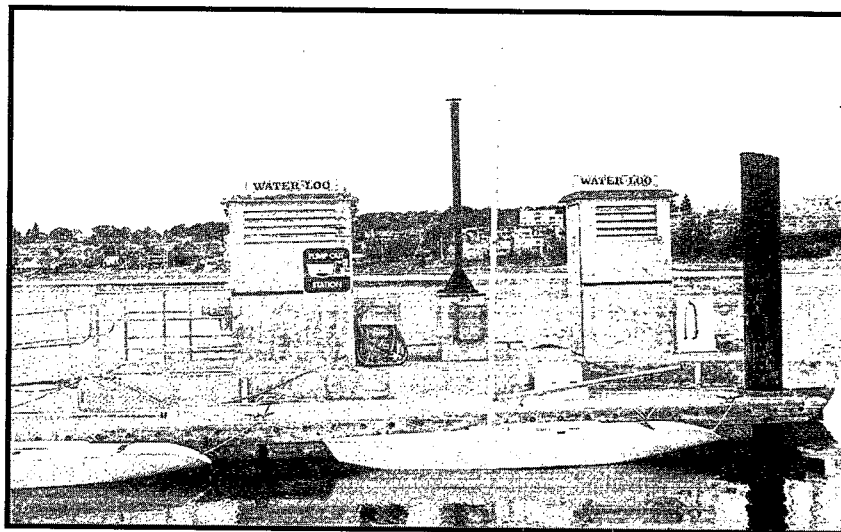
"The SS Water-Loo went into service on Memorial Day 1994 and has been a tremendous success," stated Williams. "It is tied to the end of our guest dock, which is 1/4 mile from the nearest restroom ashore. The state funded our project and is now designing, building, and using similar restroom/pumpout barges on its inland lakes and coastal parks."

In 1995 a combined total of 1,700 pumpouts were done. An estimated total 40,000 gallons of boat sewage was collected from both the barge and fuel dock, an average of 23.5 gallons per boat. Currently, the sewage goes into a city truck, which transports it to the sewer plant without charge. If the city were not providing that service, Oak Harbor Marina would have paid \$8,220 for a commercial septic removal service.

Other improvements and benefits

Signs are used extensively to educate people about good practices. The first one greets boaters: "Welcome to the OAK HARBOR MARINA - an aquatic resource dedicated to the preservation of our marine heritage through CLEAN BOATING!" Other improved practices include recycling of oil, paper, cardboard, cans, and batteries. The fueling operation was upgraded to reduce spillage, and the dock has oil spill gear available. Boaters are requested to use oil-absorbing bilge pads. A fish-cleaning station is available for customer use. A set of BMPs were developed and published and are used to train staff and tenants.

"We also enforce what people are doing. To help pay for all the clean marina enhancements, we implemented an environmental compliance fee in 1995 charging \$1.00 per month on each boat stored in a slip or on land, for a total of \$4,600. This



Oak Harbor Marina's floating restroom and pumpout barge—the SS Water Loo—with a portable toilet dump station. (photo by Oak Harbor Marina)

money goes in a special account to purchase expendable supplies, such as rubber gloves and coveralls when cleaning the pumpout barge, and oil absorption pads for the fuel dock. We lost some folk who said that boating was getting too expensive. The cost of our tidelands lease from the state has gone up. However, we have 150 on our waiting list for larger slips."

Oak Harbor Marina has a tidal grid that traditionally was used to scrape and repaint boat bottoms during low tide. Grids work well only on coasts with significant tidal range, and Oak Harbor Bay has maximum ranges from +13 feet down to -3 feet. All waste scraped off each hull fell into the water. Because of concern over high amounts of paint metals in the sediments, Oak Harbor stopped bottom repairs on the grid and posted a sign:

Tidal grid is CLOSED - except for: surveys, through-hull/rudder/prop work/zinc changes [capture all residue]. Grid may NOT be used for: hull maintenance [washing/scraping], any sanding or painting. Use of grid must be scheduled through Harbormaster.

Generally across America, tidal grids have been eclipsed by modern boat hauling equipment, such as travel lifts and hydraulic trailers. "Boat repairs in the bay are now serviced by a mobile contractor who

is setting the [environmental] standard," stated Williams. "For haulouts and hull repairs, the nearest places where travel lifts are available are at boatyards in and round the cities of Anacortes and LaConner [listed on a handout given to every boater], each about 15 water miles away."

"The SS Water-Loo went into service on Memorial Day 1994 and has been a tremendous success. The state is now designing, building, and using similar restroom/pumpout barges on its inland lakes and coastal parks."

"We also made our environmental program more noticeable with education. Everyone supports and believes in the principle of 'clean boating'; however, the doing of it often seems difficult. Every new tenant gets an information packet of rules, including Sound Information: A Boater's Guide, provided by the Puget Sound Keeps Alliance. Oak Harbor Marina's Environmental Policies, for example, state that no bottom work can be done [on land] unless over tarps," explained Williams. Clean boating practices are listed for engines and bilges, boat fueling, painting and varnishing, surface preparation, hull maintenance, sewage, solid waste disposal, and chemical storage. An excerpt from the boater's guide reads:

These are our "best management practices," and all Marina tenants are expected to comply with them. In essence, they are all common sense approaches to boat maintenance and operations, which have the common goal of keeping bad things out of the water. Please review them, and use them as you enjoy boating in this most beautiful corner of the world....As we continue to work the very important clean boating issues, your inputs are always welcome. The basic requirement is that we all take reasonable and prudent actions to keep foreign matter from polluting the waters from which we derive so much enjoyment.

Since 1982, Oak Harbor Marina has hosted a successful public aquaculture project by the Washington Department of Fisheries to boost the Coho and Chinook salmon fishery. Hatchling salmon, from

the state, are placed in two special rearing pens floating in marina slips and are raised and released when 5- to 6-inch-long fingerlings. This program runs twice a year at no cost to the marina except fish feed. The pens were built by volunteers with materials paid for by a state grant. The project has proven to be "a local community attraction, with many school classes visiting each year, and popular with our boaters," said Williams. It also demonstrates the environmental compatibility of Oak Harbor Marina, its boats, and salmon aquaculture. "To date, over 420,000 salmon have graduated from this program to be released into Puget Sound. Judging by the returns we see each year, and the reports of local fishermen, this program has been very successful."

"Oak Harbor was designated a 'bubble fishery' by the Washington Department of Fish and Wildlife because we have participated in the state's salmon-rearing project for so many years. The waters inside Oak Harbor Bay are left open for salmon fishing year-round, even when local waters outside the bay are closed."

Equipment sources

- Restroom barge: Impero Construction Company, 2041 East Bakerview Road, Bellingham, WA 98226.
- Pumpouts: On barge: SeaLand Technology, Inc., P.O. Box 38, Fourth Street, Big Prairie, OH 44611.
- On fuel dock: Edson International, 460 Industrial Park Road, New Bedford, MA 02745-1292.
- Boater environmental publication: Sound Information: A Boaters Guide; 1994, Puget Sound Alliance, 130 Nickerson, Suite 107, Seattle, WA 98109.
- Floating breakwater: Wave Guard system; Bellingham Marine Industries, Inc., 1001 C Street, P.O. Box 8, Bellingham, WA 98227.

19. Port Annapolis Marina

Screen Tarps Catch Paint Chips/Debris Under Boat Repairs

Location: 7074 Bembe Beach Road, Annapolis, Maryland 21403-3698

Telephone: (410) 269-1990 **Fax:** (410) 269-5856

Interviewed: David Gohsman, General Manager

Owned by: Port Annapolis Marina, Inc.

Waterbody: Back Creek, Chesapeake Bay

Environmental change

All outdoor boat repair is done over filter screen tarps that screen paint chips and debris from runoff water, resulting in a showplace marina.

The Marina

Port Annapolis Marina is a full-service marina that is a home port for 285 boats kept in slips and another 300 in boatyard storage on land during the summer boating season (total 585). The marina was 94% occupied during the 1995 boating season. Boats kept there are 85% sailboats and 15% powerboats, ranging from 16 feet to 65 feet LOA (average 40 feet). Transient dockage, an important profit center in the Annapolis area, is available. Most customers use the marina year-round. During the boating season there are 16 liveaboards. On a busy weekend, about 15% of the boats are used, with 10% occupied overnight.

Customer amenities include clean restrooms, laundry, pool, and restaurant. The boat services include sail rigging repair, painting, electronic sales/service, new boat sales, brokerage, and pumpout. Boats are launched and hauled with a

hydraulic trailer, a crane, and two travel lifts.

Port Annapolis Marina was built in 1965 and acquired by the present owners in 1977. It has 15 full-time employees year-round plus 4 part-timers during the summer. Within a 2-mile radius, there are 4 other marina facilities, all serving a combined population of well over 5,000 boats.

Management measures

Port Annapolis Marina achieves the marina management measures for storm water runoff control and solid waste, as well as water quality assessment, shoreline stabilization, sewage facility, maintenance of sewage facilities, liquid materials, petroleum control, boat cleaning, and public education.

Costs/benefits

During 1995, Port Annapolis Marina spent approximately \$2,000 for filter cloth tarps that screen debris and solid waste from water under boats being repaired outdoors. That resulted in clear benefits of increased slip rentals, public recognition, cleaner grounds and water, and fewer flat

tires. The marina saves an estimated \$3,500 in cleanup costs annually. The cost of the filter cloth was recovered by selling it to each boat being repaired. Less an estimated \$1,500 labor cost, Port Annapolis saved an estimated \$2,000 by investing in these environmentally sound screen tarps.

Environmental improvements

Since September 1993, Port Annapolis Marina has made major changes in its practices, which have significantly reduced

"The marina and its land-stored boats are cleaner, and I hear fewer complaints of dirt on boats in the water."

runoff and suspended solids pollution and have made the facility a much cleaner, nicer place for boaters. With so many boats stored on land

during the off-boating season, a lot of bottom and exterior work is done outdoors by the marina staff, outside contractors, and do-it-yourself customers.

In past years we have had complaints that the marina allowed people to paint their boat or to sand with open sanders, which created drifting dust that covered the ground and nearby boats," said David Gohsman. "Cleanup of boats and autos when no clear responsible party could be found cost the yard over \$3,000 in 1993 and was zero in 1995."

"Port Annapolis Marina for several years has required tarps under all boats before being sanded or peeled (usually for removal of a blistered outer gelcoat). We had been using the usual plastic tarps, which did a good job catching the debris. But when it rained heavily, everything flooded and ran off the tarp. I asked my distributor for something which would hold the dust and dirt but let water seep through. He found some nonwoven, needle-punched geotextile—the same filter cloth used under-ground in construction—made by Synthetic Industries. Since September 1994 Port Annapolis has spent \$3,000 on tarp purchases." Each 300-foot roll of the nonwoven geotextile filter cloth costs \$500, and four rolls were used in 1995 for a total

cost of \$2,000. "Most of this cost was eventually recovered by charging \$1.25 per running foot of the 12-foot-wide geotextile filter cloth."

"The marina and its land-stored boats are cleaner, and I hear fewer complaints of dirt on boats in the water. It cost us up to \$1,500 to clean some dirty boats in past years. Estimated boat cleaning cost avoided in 1995 was \$3,000 to \$4,000. This translated into an estimated \$2,000 saving of dollars and less labor to run the marina!"

"The use of tarps has had some positive side effects, such as catching old screws and nails. The marina has almost no flat tires on our autos and on the heavy equipment," Gohsman said. "This has given the boat owner a cleaner pad from which to enter the boat. Less debris underfoot and cleaner ladder rungs also mean we have had fewer falls from boats off ladders, which may be a side benefit."

"We lost some self-service business, which was steered to other marinas by a few marine contractors," stated Gohsman. "But that was more than offset by customers very much happier with our cleaner marina. Generally, there has been no loss of income on environmental supplies sold. They give us increased cooperation with most customers commenting on a cleaner marina. When our public image changed to a marina that tries to 'do the right thing,' this helped increase our slip rental operation."

Other improvements and benefits

Port Annapolis Marina is like many other marinas that are located next to houses and condo developments built after the boating facility. "With us now using tarps, tents, and dustless equipment, these folks are happy and much easier to coexist with," wrote Gohsman.

"We suspended open-air paint spraying weekends since 1994. Spraying during the week must be preauthorized in writing and

must be tented to prevent blowing. Tenting off boats is required during painting or heavy sanding/peeling."

"To catch all the dust before it gets into the air or on the ground, we bought three Fein dustless sanders in early 1994 and another three for the 1995 season. They cost us \$1,500 each. The dustless sander program is operated at a profit due to rental equipment. Boat owners paid about \$1.00 per foot to rent the sanders per day, generating \$9,520 rental income in 1995. The equipment—all paid off, still under warranty, and being written off in 3 years—gives us a great profit maker almost as good as our laundry machines!" Gohsman said.

"The usual marina joke in the spring was 'Look at the blue Smurfs.' The boat owners who enjoyed saving money and doing their own bottom (usually blue) in the past came to the ship's store generally covered with blue bottom paint. They often would not wear masks or eye protection. Now they are eager to emulate the marina worker who is in a white paper suit and is using a dustless sanding rig with full face protection."

"To control outside contractors, we established an environmental agreement that must be signed by each marine contractor who wants to work in the yard," Gohsman explained. "This agreement with the marina has had strong side effects and some push back. We have stood our ground and the number of contractors in the yard has dropped from about 95 to 48. Many of the 47 who went elsewhere, with 2 or 3 exceptions, were marginal workers doing business out of older vans or pickups. This may have cost us some business, but there is no real way to tell with the recession [1989-1993] having the effect it did on customers."

Port Annapolis Marina also lost 45 boat customers when the environmental agreement went into effect, "but these were customers who were not as interested in a clean marina as those who stayed, and we soon rented those slips to new customers,"

Gohsman said with a smile. "I suspect that the cleaner environment has an attraction and the example of tents and dustless equipment is contagious. Cars and windows are visibly cleaner."

Other environmental improvements include installing a pumpout station in 1988 with a grant from the State of Maryland. The pumpout cost \$2,500. The service is free for slip customers and \$2.00 for others, and the marina did 309 pumpouts in 1995. The pumpout is located on a pier T-head and is operated by marina staff.

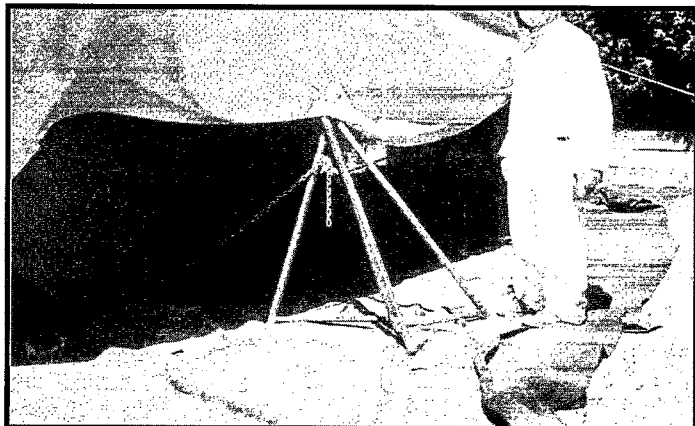
Port Annapolis Marina has a designated hull work area in the boatyard away from the water. It has filters and traps to control solids from the hull pressure wash area. There is oil spill cleanup equipment kept handy in the storage area near the lift well. Recycling is done for cans, bottles, batteries, and used oil.

"Local and federal regulators come here as if we were a 'showplace' and bring others for a look," said Gohsman. "Chesapeake Bay magazine, based on customer polls, gave Port Annapolis Marina the 'Best Repair Yard in Annapolis' Award in both 1994 and 1995."

Equipment source

- Filter cloth, heavyweight geotextile: #701 nonwoven, needle-punched geotextile; Synthetic Industries, Inc., 4019 Industry Drive, Chattanooga, TN 37416.

Port Annapolis Marina places a reusable filter cloth beneath boats under repair. (photo by Port Annapolis Marina)



20. Puerto Del Rey Marina

Clean Water Attracts Customers

Location: State Road #3, Km 51.4, P.O. Box 1186,
Fajardo, Puerto Rico 00738
Telephone: (809) 860-1000 **Fax:** (809) 860-7592
Interviewed: Daniel Shelley, President
Owned by: Daniel Shelley, Puerto del Rey, Inc.
Waterbody: Atlantic Ocean/Caribbean Sea

Environmental change

Improved water circulation resulted after this Caribbean island marina opened a breachway in its solid breakwater.

The world class marina

"Puerto del Rey" means "king's port" in Spanish and demonstrates owner and developer Daniel Shelley's plan to build a marina with strong linkage to Puerto Rico's colonial heritage. Now the Caribbean's newest, largest full-service marina, Puerto Del Rey is a major boating gateway to the Virgin Islands and the Lesser Antilles. Completed in 1988, this "king's port" in 1995 was operating at near its capacity of 700 slips on concrete fixed piers and 450 covered dry racks for smaller boats three-high, with extra spaces along piers and at anchor for transient boats.

On an ocean-exposed beach pounded by storm waves from the east, Shelley first constructed an offshore graded stone rubble mound, 1,600 feet long. With 3-ton armor stones, the solid breakwater sits in water 20 feet deep and rises to 11 feet above mean high water at its top. The breakwater runs north to south, parallel to the beach, and was originally connected to the land with

another 1,600-foot stone rubble mound jetty—in a shape somewhat like the letter L—which also protected the southeast exposure. The structures met their first major test when Hurricane Hugo's eye passed directly over a half-full Puerto del Rey in 1989. Hugo extensively damaged other marinas on eastern Puerto Rico before moving on to damage the U.S. mainland. However, Shelley's massive breakwater and reinforced concrete piers successfully survived with no structural damage, only 5% of the boats sunk, and moderate damage to others—a testament to Shelley's insistence on major protection and the design of Moffatt & Nichol Engineers.

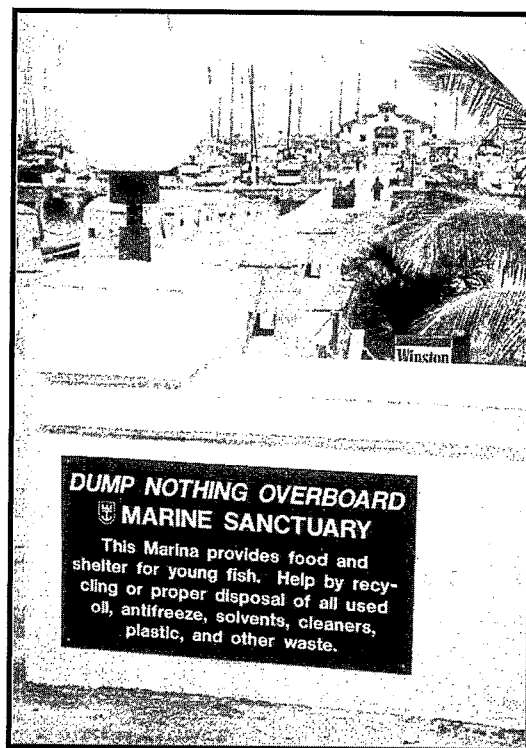
About 80% of Puerto del Rey's customers are Puerto Rican residents who make the marina their home port. It is also a destination marina and a stop-off for transients from other ports and countries. Open year-round, the marina's busiest boating season is from October through April. Only 30 of the 1,150 boats are used as liveaboard residences. Boats range in size from 30 feet up to 150-foot yachts.

In addition to slips and rack storage, Puerto del Rey Marina offers a wide and unique mix of other services—unusual in the Caribbean. For boat care, there is a full-

service boatyard that moves boats with a combination of a 60-ton hydraulic trailer, a 77-ton travel lift, and three marina forklift trucks. Maintenance services include painting and repairs to hulls, fiberglass, and engines. A fuel dock with pumpout is available at the harbormaster's pier, near the marina's south entrance, which also houses the U.S. Customs Service Office. One separate section of the marina is available for commercial fishing boat use and a ferry to St. Thomas. The Puerto Rico Department of Natural Resources (DNR) is using a building for its Regional Fisheries Office and has its own dock for its small research vessels. There are no other marinas within a radius of 2 miles, and there is a combined fleet of nearly 2,000 recreational boats in the Fajardo area.

For boaters' comfort, extra-wide fixed (nonfloating) piers accommodate a large number of people walking and motorized carts driven by marina staff who ferry people to and from parking lots to their boat slips as far 1,200 feet seaward. Excellent restrooms and showers are available to all boaters and guests, as are a laundry, four restaurants, vending machines, a used boat brokerage, a ship's store, a car rental agency, an open air plaza, a children's playground, a heliport, and condo apartments with some available for rent. The Puerto del Rey Yacht Club helps to organize boating events and educational programs.

"First-class" is inadequate to describe this marina, which is more "world-class" in its design, construction, amenities, services, and management. But this is just the beginning of a much larger full-service resort and coastal land development project planned. Interestingly, Shelley decided to build the marina first as the cornerstone to the rest of the project. Just as the first Spanish settlers always built settlements at the harbor, so here establishing the port was of primary importance.



"Dump nothing overboard—marina sanctuary" sign, posted in Spanish and English.

Management measures

Puerto del Rey Marina achieves the marina management measure for marina flushing, as well as the measures for water quality assessment, shoreline stabilization, storm water runoff control, fueling station design, sewage facility, maintenance of sewage facilities, solid waste, liquid materials, petroleum control, boat cleaning, and public education.

Cost/benefits

Removal of a 200-foot section of the 1,600-foot stone rubble mound jetty cost \$30,000. The new breachway offers a south exit from/entrance to the marina and provides better flushing for the waters enclosed by the breakwater. In 1995 an estimated 3% more boats came to Puerto del Rey Marina because of its superior water clarity, resulting in an additional annual gross income of \$50,000.

Environmental improvements

Puerto del Rey Marina removed 200 feet from the outermost end of its 1,600-foot stone rubble mound jetty connection to the offshore breakwater. It cost \$30,000 for a dragline crane and labor to remove the

stone and gravel down 20 feet to the original seabed.

The material was placed on the breakwater for extra thickness and protection.

The breachway was opened for two reasons: to give boats a more pro-

ected south entrance when the wind waves were coming from the northeast, and to allow better water circulation. "I was afraid that without the opening, the marina basin would have the same cloudy appearance as most of the other marinas around us," said Shelley. "I want the cleanest, safest marina anywhere."

Once the opening was made and the docks began to fill, "People visited from other marinas and liked our clean water. I estimate that Puerto del Rey specifically attracted 3% more boats, which relocated here because of the water clarity. And that represents an annual gross income of \$50,000 in 1995." If the cost of making the

"I estimate that Puerto del Rey specifically attracted 3% more boats, which relocated here because of the water clarity. And that represents an annual gross income of \$50,000 in 1995."

opening in the breakwater is amortized over 20 years at a 5% interest rate, its annual write-off cost would be \$2,400, which reduces the net return to \$47,600. "Not too bad!" said a smiling Dan Shelley.

Other benefits

Most of the natural sloping sandy beach was left undeveloped to retain much of the original shoreline and to help dissipate any waves that might enter the marina or be caused by boat wake. One unanticipated environmental advantage is that floating trash and seaweed, instead of accumulating in slips or in the boatyard, wash onto the beach at the high tide line and can be easily cleaned up by marina staff.

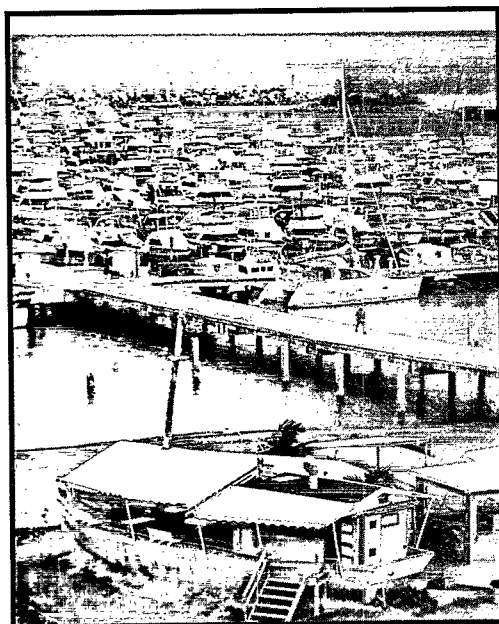
The Puerto Rico DNR Fisheries Office, in cooperation with the marina, rescues injured sea turtles, which has also become a popular event for the boaters and public.

Signs, in English and Spanish, explain the importance of keeping the marina clean. Some of the sign language came directly from a spring 1995 Marine Environmental Management Workshop—one of a nationwide educational series sponsored by the International Marina Institute.

"Puerto del Rey will have the only working pumpout in the entire Caribbean Sea," claimed Shelley. "We have been approved for a Clean Vessel Act pumpout grant to expand our existing boat sewage handling capabilities as a demonstration project for other marina owners in Puerto Rico." He hopes to have the pumpout completed for the 1995-96 peak "winter" boating season. Pumpouts will be free.

The boatyard will be moved inland about 1,000 yards onto a vacant industrial yard, possibly during 1996. This move will reduce the chance of boat repair pollutants from reaching the sea to almost zero. And it will free the waterfront for other, cleaner boating services and amenities. The now full dry storage racks will also be expanded, to double their capacity, allowing more small boats to use the marina without the need for annual bottom painting.

Openings in the far corner of the 1,600 foot long solid rock breakwater gives excellent hurricane protection and allows improved water circulation and boating access.



21. Summerfield Boat Works, Inc.

Wash Water Recycled Without Chemicals

Location: 1500 S.W. 17th Street, Fort Lauderdale, FL 33312

Telephone: (954) 525-4726 **Fax:** (954) 525-8613

Interviewed: Tom Correll, General Manager

Owned by: Susan Summerfield Watts

Waterbody: South Fork of the New River

Environmental change

Boat pressure-wash water is filtered, treated with ozone—not chemicals—then recycled.

The full-service boatyard

Summerfield Boat Works, Inc., is primarily a private commercial boatyard with full and do-it-yourself services. It has 100 slips (60 covered) and 40 land storage spaces (total capacity of 140). Sixty percent of the boats are sailboats and 40% are powerboats, ranging from 21 to 82 feet LOA (average about 40 feet). There are 20 full-time employees year-round and up to 4 additional employees during the prime boating season, October through June.

In addition to offering storage, Summerfield Boat Works caters to seasonal and transient visitors. On a busy weekend, about 30% of the boats are used. Restrooms and showers are available to customers. No liveaboards are allowed. The marina provides haulout and launching with its travel lift, crane, and forklift. Repair services include work on fiberglass, hulls, and engines; sail rigging; painting; canvas/sail making; electronics; welding; carpentry; and hull cleaning. The marina

also has a retail parts store, used boat brokerage, pumpout station, and cold beverage stand.

Fort Lauderdale calls itself the "Yachting Capital of the World," and from the numbers of boats and marina facilities, it certainly has earned that title—which means that competition for services is high. Within a 2-mile radius of Summerfield Boat Works there are 10 other marinas and boatyards, all serving a boat population of up to 4,000 vessels. Summerfield was built in 1933 and bought by the Summerfield family in 1940. The yard is located in a residential area that was built after the facility.

Management measures

Summerfield Boat Works achieves the marina management measures for storm water runoff control and solid waste, as well as sewage facility, maintenance of sewage facilities, liquid materials, petroleum control, boat cleaning, and public education.

Costs/benefits

Summerfield Boat Works spent \$30,075 to change its boat bottom wash process into

a closed water-recycling system. Amortized over 10 years, the annual cost of the system is \$3,895. The operation and maintenance cost was \$3,800 in 1995. New income generated from 150 boats hauled for bottom cleaning was \$18,750, plus an additional \$75,000 in work orders. Filtering and reusing wash water saved 24,000 gallons of water, resulting in an estimated saving of \$500 in water bills. The net benefit of the investment to Summerfield during 1995 was estimated to be over \$86,000.

Environmental improvements

Summerfield Boat Works is an older boatyard that has begun transforming itself into a clean business. The first changes were conversion of the boat high-pressure wash-down process and elimination of in-water hull cleaning. A common practice across the United States was to allow all the bottom washwater, containing fouling growth and paint flecks, to discharge directly into the waterway. When Broward County, Florida, focused on marinas and

boatyards, one regulation required the elimination of this discharge or a shut-down of bottom washing.

"In the fall of 1991, it cost the yard \$30,075 to make appropriate changes

to clean the wash water for reuse," Tom Correll said. "We bought a \$7,000 water filtering system, including an ultraviolet light ozone generator to oxidize all the dissolved pollutants and erase all odor. By choosing ozone to treat the water, the Boat Works eliminated the need to use chemicals, with their extra cost and hazards."

"We spent \$5,000 on labor and \$18,000 for the concrete pad and landscaping, plus \$75 for a building permit. John Lee, Summerfield Yard Superintendent, really is the one who did the engineering and assembly to make our bottom wash recycle system work."

Annual operation and maintenance costs for this system are \$1,000 for filter replacement, \$300 for pump parts, and \$2,500 in labor, for a total of \$3,800 in 1995.

"We annually clean about 1,200 bottoms per year. Of these, new income was generated from 104 boats hauled for yacht surveys and 46 boats that would have been in-water bottom cleaning before, earning \$18,750 above previous years. And those same boats generated an additional \$75,000 in work orders. I figure that new work was worth a total of \$93,750 in 1995."

"We used about 20 gallons of fresh water when washing a bottom, or 24,000 gallons per year," added Correll. "Now that we treat the water and reuse it, we are really saving water, and saving the \$500 it would have cost us."

"Without the ozone treatment, the water would have gone bad and smelled. I urge anybody thinking about doing this to buy state-of-the-art equipment rather than making it themselves," added Correll. "By recycling, we are not discharging an estimated 24,000 gallons of wastewater into the river each year. Customers can get their bottoms done here legally, and we have had a good impact on the river's water quality. This has increased our revenues and gives us good references to new customers. And by having us comply, we make government look good when they point to the results of their legislation and enforcement."

All do-it-yourself boat maintenance work is done in designated areas of the yard set back from the bulkhead. Customers receive several handouts that discuss the need to control pollution.

In order to assist with Broward County Office of Natural Resource Protection policy regarding dust emission as well as to help keep the neighborhood and environment as clean as possible, this facility asks your help in controlling the sanding and grinding dust generated during haul out....

Whenever any grinding is to be performed, it will be necessary to drape the

"Now that we treat the water and reuse it, we are really saving water, and saving the \$500 it would have cost us."

work area with tarps in order to prevent the dust from migrating into the air....

Please, do not wash down your sanding dust. Damp rag your hull and vacuum the ground, as required or requested.

Customers are asked to sweep the dust from their work areas daily. Prohibited from the yard are wet sanding of boat bottoms, and wet or dry sandblasting. "I bought a used commercial riding vacuum machine, which I drive throughout the yard every day to pick up any dust and bits of litter. All these new practices do result in cleaner water and neighborhood environment," said Correll.

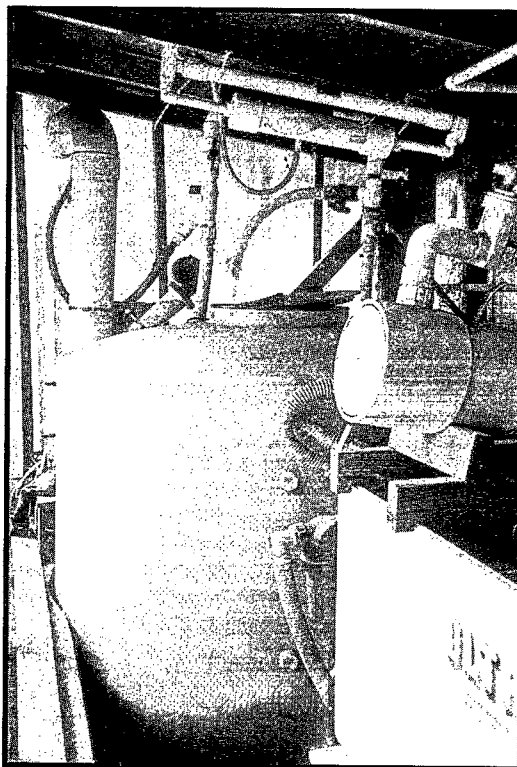
Other improvements and benefits

Summerfield Boat Works has taken a number of steps to help keep the water clean. Restrooms were recently upgraded. With much of the boat maintenance work do-it-yourself, Summerfield uses flyers and signs to educate customers and outside contractors.

All boats hauled for bottom pressure washing are charged an Environmental Cost Obligation (ECO) above the normal hauling cost. The ECO fee is on a sliding scale: \$15 for boats under 35 feet, \$20 for boats 35 to 44 feet, \$25 for boats 45 to 54 feet, and a top fee of \$30 for boats 55 feet and larger.

"This facility is required by law to comply with sound environmental procedures. By charging the wash water fee, Summerfield's is trying to recoup some of the increased costs of compliance with the various regulations. Even though the yard is required to comply with the regulations and management fees, it is important for each to do their share in protecting Florida waters. It also allows the yard to update our equipment and practices prior to being legislated to do so."

Waste oil is collected and recycled. Customers are warned that any oil discharge is prohibited and "anyone not



The closed-loop filter and water purification system includes ozone treatment, beside the Summerfield Boat Works' wash down pad.

complying will be promptly reported to the Coast Guard and EPA." Summerfield removed its old fuel tanks and no longer offers fuel sales.

Drinking water supply is a major concern in South Florida, and Summerfield Boat Works asks customers to conserve water by limiting boat washing to once a week. "All hoses must have shutoff nozzles attached when in use. All connections must be tight and not leak or drip."

While most of the boatyard was paved many years ago, Correll decided to add a new parking area across the street, and built it unpaved with perimeter landscaping to fit into the neighborhood.

Aluminum cans are collected and recycled for cash. That money goes into a special employees account used for Christmas bonuses. It has created great employee interest in recycling. Paper, batteries, and metal are also recycled reducing the volume that goes to the county landfill.

An enthusiastic customer of the boatyard made a promotional video that

highlights the cleanliness of the boatyard and the quality of boat services. The Marine Industries Association of South Florida often refers to Summerfield's as a model operation. Tom Correll is justifiably proud of the clean practices he has implemented at Summerfield Boat Works.

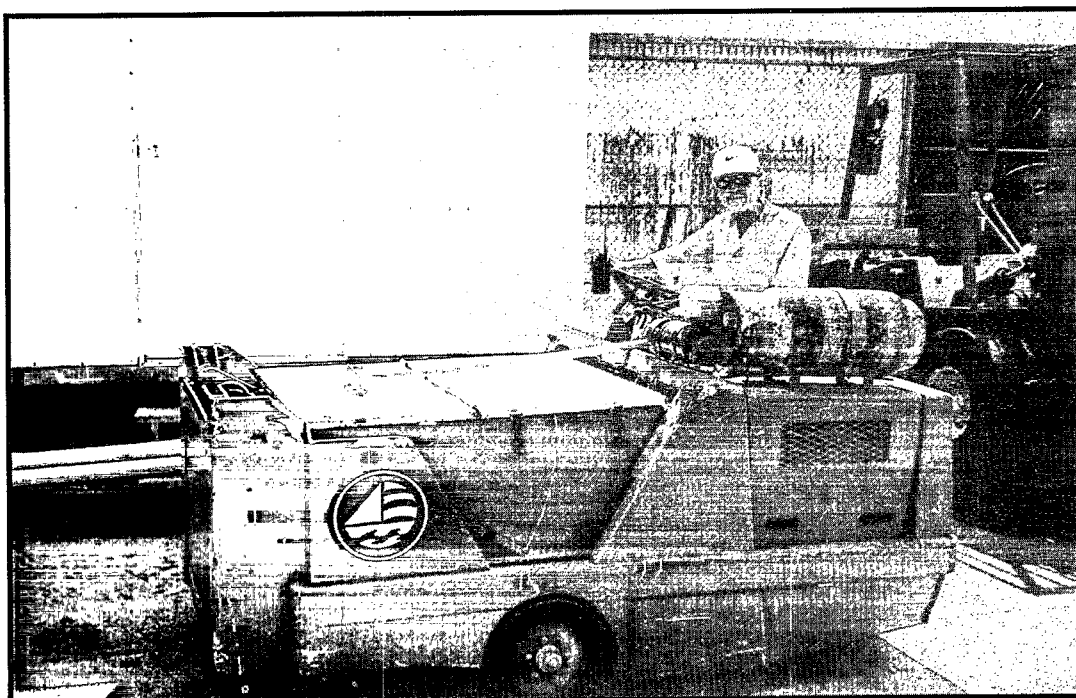
Equipment source

- Ozone equipment: Genesis Environmental Systems, Inc., 1101 South Rogers Circle #16, Boca Raton, FL 33487.

Alternative source: Turbohydrozone; RGF Marine Environmental Technologies, Inc., 3875 Fiscal Court, West Palm Beach, FL 33404.

- Bilge oil pad: Bilge Buddy; Advanced Aquatic Products International, Inc., 1107 Key Plaza, Suite 201, Key West, FL 33040.

Summerfield Boat Works' vacuum sweeper picks up debris and dirt from boat maintenance areas.



22. West Access Marina

Used Oil Recycled to Heat Boat Repair Building

Location: 14222 Lake Road, P.O. Box 186, Carlyle, Illinois 62231
Telephone: (618) 594-2461 **Fax:** (618) 594-2226
Interviewed: Richard W. Golding, CMM, General Manager, Partner
Owned by: Carlyle Limited Partnership, dba West Access Marina
Waterbody: Carlyle Lake, Kaskaskia River

Environmental change

A high-temperature oil burner consumes oil collected from servicing boats and marina vehicles and heats a work building, thus avoiding high costs for both oil disposal and energy.

The full-service inland lake marina

West Access Marina is a U.S. Army Corps of Engineers concession home port marina with 330 slips and 170 dry land spaces for boats on trailer storage. During the 1995 boating season, with annual slip rentals from April 1 through March 31, the slips were 98% sold out and the land storage 50% used. Boats range from 17 to 50 feet LOA (average 26.7 feet). Unlike most marinas, 92% of the boats are sailboats. In addition to seasonal slips, the marina also provides transient space for visiting boaters. The marina has a yacht club, boat rentals, used boat brokerage, trailer sales, retail store, fuel dock, and pumpout. A public beach and boat ramp are within 300 feet of the marina. On a busy summer weekend, typically 50% of the boats are used, with about 30% used for overnight stays. There are no liveaboards at West Access.

Marina services include launch and haulout using the marina's hydraulic trailer and marina railway. Sailboats can be hauled, stored, and launched with the mast up. Repairs are done to hulls, fiberglass, engines, sail/rigging, painting, electronics, and welding. Land storage is also available for customer's cradles, trailers, and jack stands. There are no other marina facilities within a 2-mile radius, but there are almost 750 boats in use in the area that potentially need service at West Access Marina.

Called "Illinois's other Great Lake," Carlyle Lake, an inland lake, is located in southern Illinois about 45 miles due east of St. Louis, Missouri, and about 260 miles southwest of Chicago. It was created by the Corps of Engineers in 1967 for flood control, recreation, and navigation on the lower Kaskaskia River. West Access Marina was built in 1971 and was bought by the present owners in 1990.

Because Carlyle Lake is the principal drinking water resource for the City of Carlyle and other communities downstream, maintaining high water quality in the lake is essential for the marina and all other users.

Management measures

West Access Marina provides for the collection and reuse of liquid materials, and achieves the marina management measures for water quality assessment, habitat assessment, storm water runoff control, sewage facility, maintenance of sewage facilities, solid waste, petroleum control, boat cleaning, and public education.

Costs/benefits

West Access Marina invested \$7,000 to buy and install a used oil furnace and spends \$300 annually to heat its boat maintenance building in the winter. By doing so, West Access Marina created a new profit center that earned \$9,495 from additional boat repairs, saved \$1,095 in heating oil costs, and avoided \$9,099 in waste oil removal/disposal costs in 1994-95.

Environmental improvements

Each year, West Access Marina's boat engine maintenance services collect between 1,000 and 2,000 gallons of waste oil. Getting rid of that waste material is a costly problem that faces most marina and

boatyard operations. "We eliminated the disposal problem and cost by burning the oil in a new high-temperature furnace in our boat repair building," Richard Golding explained. "It was installed in October 1993 at the suggestion of my yard foreman. It hangs from the ceiling of our 60-foot by 60-foot shop and keeps the boats warm enough to work on them throughout the winter's cold. The used oil (now fuel) is stored in a 1,000-gallon drum, but is collected in smaller barrels in designated storage sites in the work yard. Before we installed the furnace, the shop was unheated and work could only be done on warmer days. Now we have a year-round boat maintenance business."

The Clean Burn multi-oil furnace burns at 3,000 degrees Fahrenheit, uses a compressor to vaporize the fuel, and shoots a flame almost 3 feet long. "Because of the high temperature, it burns very clean," observed Golding, "and nothing comes out the stack." According to the manufacturer, such furnaces are allowed to be used in all states except California. They can burn a mix of petroleum products with some solvents as long as none of the products have been labeled hazardous by a manufacturer.

The furnace and air compressor cost \$4,100, plus \$2,900 labor, for a total of \$7,000. The burner cleaning contract costs \$187, which together with \$113 in filters, compressor electricity, and labor results in a total annual operating cost of \$300.

"Every 55-gallon barrel of waste oil costs \$283 to be removed and disposed of properly, plus \$54 for a replacement barrel—\$337 per barrel," Golding calculated, "or \$6.13 per gallon."

"During the 1994-95 winter we collected and burned 1,500 gallons from our work, yielding \$9,099 waste oil removal cost avoided. We recycled the oil into heat energy for a nice \$1,095 fuel saving (average \$0.73/gal). We do need to buy more heating fuel, however, because our shop burns more oil than we produce. We expect

Used engine oil is saved as a fuel by West Access Marina. (photo by West Access Marina)



to save even more from collecting and burning an estimated 2,000 gallons of waste oil during the 1995-96 winter."

"The extra boat work we did on days previously too cold for work, I estimate, generated \$9,495 new income. We really created a winter repair profit center we never had before. Between savings and new work, we came out ahead by \$19,689," said a proud Golding.

"Since the winter of 1993, we have insulated the walls and put a ceiling in the now-heated building. When not repairing boats, we have rebuilt two tractors, rebuilt the lawn mower, and replaced two hydraulic cylinders on the trailer while rebuilding its axles. These were all done during the winter months in a building that was unused before because it had no heat source."

"Beside the savings, the waste oil is no longer a problem, and we don't find surprises in the dumpsters with obvious environmental benefits. People now come to the lake and say it looks cleaner—and it is. A clean marina helps boating customers, families, and friends enjoy boating here."

"There are eight other waste oil burners in other businesses around the area," Golding added. Many states allow burning waste oil collected as part of the normal business operations from work on boat engines and the yard's own cars and trucks. Interestingly, if oil collected during this work is placed in a barrel labeled "fuel oil" for heat, it is viewed very differently by regulatory agencies than oil labeled "waste oil." For every gallon of used oil burned as fuel, West Access Marina saves \$6.86 (\$6.13 removal/disposal and \$0.73 new heating fuel purchase avoided).

Other improvements and benefits

West Access Marina practices positive public education. "We send an environmental fact pamphlet annually to all customers which talks about protecting the lake,

antifreeze as a poison, pumpouts, recycling, waste disposal, and vacuum sanding."

About oil, it says,

Any oily sheen on the water is pollution. Soap or bilge cleaner changes the molecular structure, but does not mean it is no longer a pollutant—it just makes it heavier than water and it settles to the bottom. Let us show you what is available to protect our Lake and the environment.

Please don't overfill your fuel tanks or pump oily water from your bilge into our Lake. The Bosun's Locker has oil absorbent pads that allow correct disposal.

On each dumpster in the marina, all four sides have a sign:

West Access Marina. Promotes and participates in the 'Clean Marina' program. Please let us assist you with the proper disposal of batteries, paints and solvents, oils, fuels and the filters for these items.

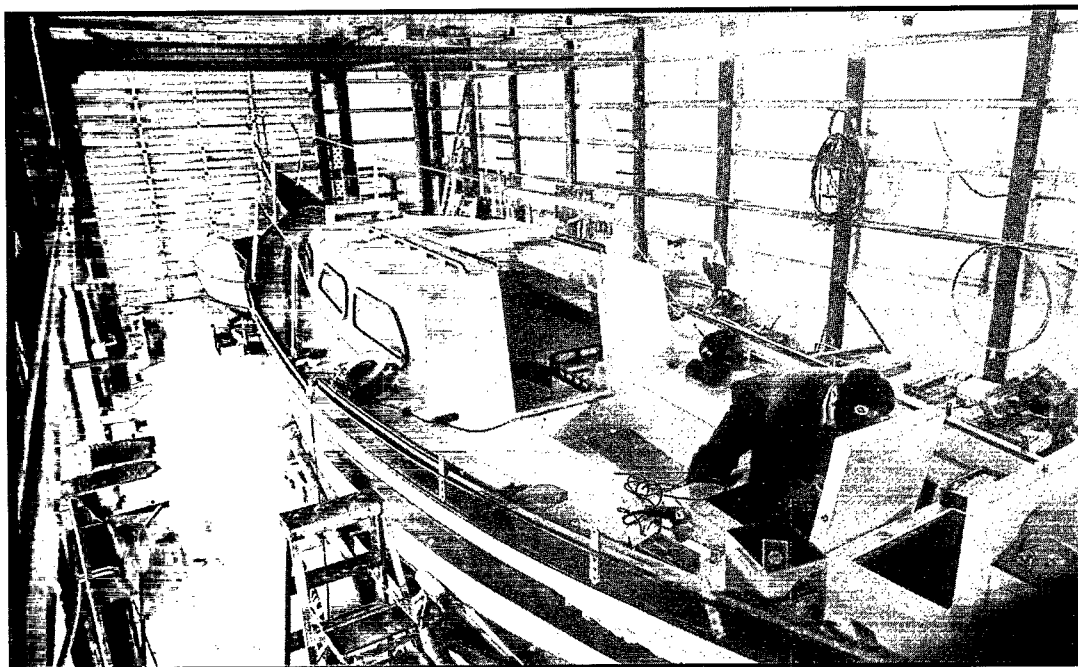
Thank You.

"We keep trying to improve our marina. Making a clean marina is a daily task," said Golding. "We have made many changes, such as installing a free self-serve pumpout and a portable toilet dump station, and upgraded our restrooms. To control runoff, we changed the contour of the marina with grassy berms, permeable parking lots, and a designated hull work area. Our fueling dock was improved with new spill prevention practices and added spill containment gear. Boats are urged to use oil-absorbing pads in their bilges. In addition to the oil, we recycle wood, metals, and foam flotation from old docks. Boat batteries are collected and immediately handed to a nearby auto parts store, which gives us a \$5.00 credit per battery for recycling."

As with many marinas that allow do-it-yourself boat repairs, West Access Marina insists on the use of dustless sanders as a major BMP against dirty runoff. The marina's brochure highlights the need for

"Before we installed the furnace, the shop was unheated and work could only be done on warmer days. Now we have a year-round boat maintenance business."

Winter boat repairs are made possible by burning used oil in a special approved oil heater at West Access Marina. (photo by West Access Marina)



using vacuum sanding. Two Fein dustless sanders are available for rent by customers for \$5.00 per hour, plus sanding disks. "We are considering buying a third sander because they pay for themselves with rental, plus we make 40% profit on the sanding disks and other supplies."

All other waste liquids not burnable as fuel are put into marked barrels and picked up regularly by Safety Kleen, a nationwide commercial service. West Access Marina was the first marina in Illinois to get an NPDES storm water permit.

"I estimate that our clean marina image brings in an extra \$50,000 gross in repair work each year, and helps explain why we are 98% occupied even though we have the highest slip rate on the lake. Our relations with the city are very good, but were not always good before we came. The Chamber of Commerce promotes our marina as valuable to the development of the area," Golding explained. "We are a nicer place to work, and have no trouble keeping employees and customers."

As a concessionaire on Corps of Engineers property, West Access Marina has a

good image, especially for environmental practices. The Corps uses it for ERGO (Environmental Review Guide for Operators) training as a benchmark marina. The Carlyle Lake Management office manager, Robert Wilkins, wrote: "West Access Marina is one of the best run marinas I have been associated with in my 21 years with the U.S. Army Corps of Engineers. If all marina operators were as committed as Mr. Golding, there would be no need for laws or regulations covering marina operations. He takes care of the environment and his customers."

This demonstrates that clean water, clean marinas, and clean boating start with good owners and managers like Richard Golding. West Access Marina is definitely an asset to its area.

Equipment source

- Used multi-oil furnace: Clean Burn, Inc., 83 South Groffdale Road, Leola, PA 17540.
- Hazardous waste removal: Safety Kleen, Inc., 1000 North Randall Road, Elgin, IL 60123-7857.

23. Winter Yacht Basin, Inc.

Personal Watercraft Fueling Made Spill-proof

Location: 5 Mantoloking Road, Mantoloking, New Jersey 08738
Telephone: (908) 477-6700 **Fax:** (908) 477-0037
Interviewed: Kenneth R. Winter, President
Owned by: Kenneth R. Winter
Waterbody: Barnegat Bay, Intracoastal Waterway

Environmental change

Installing a special floating raft for personal watercraft at the marina's fuel dock virtually eliminated spills during fueling of the small boats.

The full-service marina and boatyard

This New Jersey boatyard was purchased in 1950 by Rudolph and Lydia Winter and became Winter Yacht Basin, Inc.—a full-service boatyard and builder of wooden Jersey Sea Skiffs, with dockage. Over the years the business has evolved into a 110-slip, full-service marina and boatyard, now owned and managed by the Winters' son Ken. The boatyard employs 21 full-time workers year-round, with an additional 4 part-timers during the boating season. The average boat kept in this home port marina is 40 feet LOA; lengths range from 18 feet to 65 feet. Twenty-five percent are sailboats, and 75% are powerboats.

In 1995, the marina was 70% occupied for the season, with the remaining space available for docking transients cruising the Intracoastal Waterway. On a typical high-use summer weekend, about 60% of the boats were in use, with about 25% occupied overnight. There were no liveaboards. The boating season typically runs from April to November.

Sited beside a bridge, the yacht basin is on the narrow Intracoastal Waterway channel, ideally located for gas and diesel sales at its fixed fuel dock. A self-serve pumpout station is available adjacent to the super-clean restrooms. A ship's store, laundry, and yacht brokerage round out the marina services.

The boatyard services include haulout/launching with a travel lift, forklift, and marina railway. The full range of repair services include fiberglass, hulls, engines, electrical, sailboat rigging, wood work, custom cabinet making, painting, and bottom cleaning.

Prior to purchase by the Winters, the boatyard had been a boat-building company since 1928. Within a 2-mile radius there are 3 other marinas, all serving an estimated 1,500 boats.

Management measures

Winter Yacht Basin achieves the marina management measure for fueling station design, as well as the measures for shoreline stabilization, storm water runoff control, sewage facility, maintenance of sewage facilities, solid waste, liquid materials, petroleum control, boat cleaning, and public education.

Costs/benefits

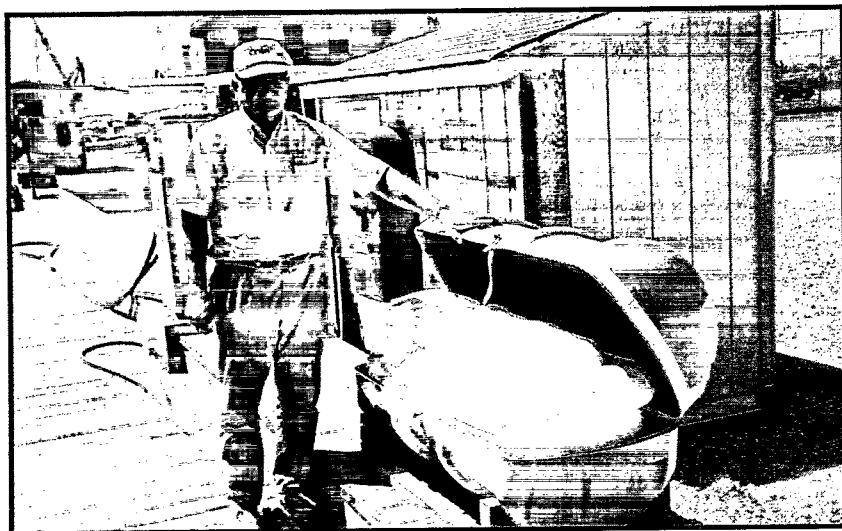
Winter Yacht Basin's two new personal watercraft drive-on docks cost \$3,138 installed, but brought in \$6,370 extra fuel income just in the first boating season. They virtually eliminated the small fuel spills that had occurred at most fill-ups. With an amortized annual cost of \$406, plus a maintenance cost of \$400, the net 1995 income was \$5,560.

Environmental improvements

Having a well-located fuel dock, Winter Yacht Basin attracts boats of all types and sizes, from small personal watercraft (PWCs) up to large yachts cruising the waterway. But with such a mix of boats being serviced, Ken Winter said, "Frankly, I was not happy with PWCs for two reasons:

- When large boats arrived to buy 500 to 1,000 gallons of fuel, the dock often was occupied with a couple of personal watercraft buying only 5 gallons each, and we had to keep the big boat waiting.
- Environmentally, with the small PWCs rocking from side to side, it was nearly impossible to fill them without some fuel spilling, and they often got some water in their fuel tanks."

Winter Yacht Basin owner Ken Winter keeps spill control equipment handy at the fuel dock.



"We solved both problems in May 1995 by buying and installing two SportPort drive-on docks at the east end of our fuel pier. These were primarily made to store jet skis and wave runner boats up and out of water. But we thought they would work well at our fuel dock. Our two 4-foot by 10.5-foot floats, bolted side by side, were connected to PVC pipes to allow them to ride up and down with the tide," Winter explained.

"When a PWC arrives to buy gasoline, the usually young driver nudges the bow onto the front of the float, gives it the gas, and the craft rides up completely onto the dry polyethylene platform. The operator steps off the boat onto the dock, is handed the fuel nozzle, and fills the small tank without any spilling because it so stable. When done, the driver mounts the PWC, starts the motor, and leans way back, and the boat slides into the water."

"The best part for me is that we placed those drive-on floats at the end of our fuel pier, which is too narrow for large boats to use. All the conflicts at the big boat fuel dock are gone. Because the PWC users find our drive-on floats so easy and fun to use, they come from all over, and we are selling much more fuel to them. And since virtually all the fuel spills have stopped, we have no cleanup costs."

The two SportPort floats were purchased for \$1,600 in 1995. The cost for installing them was \$1,158 for labor, plus \$380 for a separate sign. "We haul out these docks for the winter and launch them in the spring. Thus our maintenance cost is about \$400. When we figured it out, we sold \$6,366 more fuel to PWCs than we did last year!" a smiling Winter exclaimed. "And we'll probably do better next year. Now I like the personal watercraft business."

Other improvements and benefits

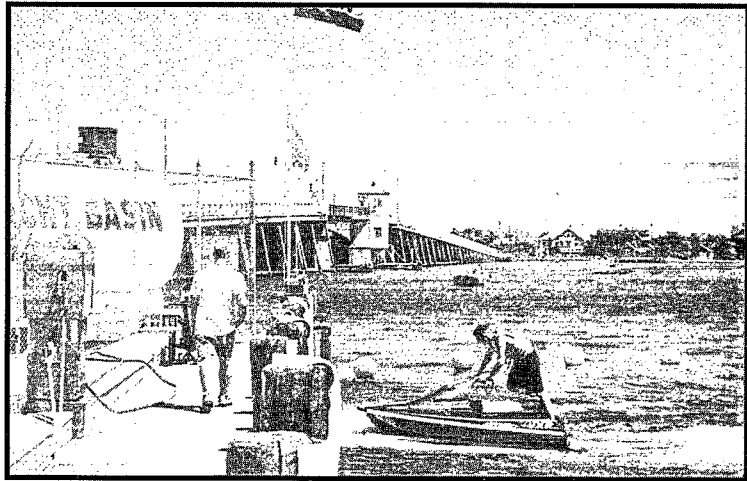
The first impression one gets visiting Winter Yacht Basin is how ultra neat and

clean it is. The grounds are immaculate. No litter can be found anywhere. The restrooms sparkle. Many pretty flower beds are scattered around the facility—all well-tended and in colorful bloom. To do this the yard has one full-time, year-round employee who only cleans the grounds, buildings, gardens, and work areas. Winter said, "We make this a nice place to come to."

The second impression is the range of 17 different sized buildings scattered about the property. One is the main office and ship's store, while the others are for either indoor boat repair or storage. Every one is neat and clean. "More and more customers want good repairs and service, but done in environmentally friendly ways," said Winter. "A boat is a further expression of one's personality, and the owner of a \$1.3 million Hatteras doesn't want messy work. My employees are thinking cleaner and that is reflected in higher-quality work. For example, I find that a mechanic who works cleaner is generally more detail-conscious. Our customers know when they come here that they will pay for clean, quality work, but they also know they will not need to come back to have the job done again to make it right."

The yard's underground fuel tanks were removed and replaced in 1993 with above-ground tanks set in concrete containment. Winter said, "I expect all the fuel tank replacement to have payout in 8 years."

The marina has a spill control plan available in the main office, with copies in the fuel dock house, parts manager's office, and yard office. Spill control booms are easily accessible on the fuel dock from brightly colored fiberglass lockers formerly used for ship life rafts. For easy access, cleanup pads are available in the dock house there, while three emergency response bags are waiting in the parts manager's office for bigger spills, along with the emergency response handbook. Oil, antifreeze, and waste oil containers are stored indoors within bermed containment areas. Regular yard maintenance is con-



Personal watercraft were a problem at Winter Yacht Haven until two side-by-side drive-on docks were installed on Barnegat Bay, New Jersey.

ducted to ensure all used and unused supplies are returned or disposed of in a proper manner. Until Ken Winter decides on a long-term solution to control suspended solid runoff from the hull pressure-washing area, he is effectively using a row of common hay bales, which are very good temporary filters. Storm drains are being fitted with 1/4-inch mesh hardware cloth baskets with inserted filter material.

All employees and customers receive a copy of Winter Yacht Basin's best management practices (BMP) and sign a release that they have read and understood the BMPs. Awareness training programs are held several times a year to teach yard employees to recognize sources of pollution and report them to their supervisors.

"We have always had the reputation of a clean boatyard, but we are even cleaner now." And Ken Winter has a list of several more ways he plans to improve the marina's environmental impacts over the next few years.

Equipment source

- PWC drive on dock: SportPort; manufactured by Zeppelin Marine
1801 Spanish Trail, Delray, FL 33483.

"Because the PWC users find our drive-on floats so easy and fun, they come from all over, and we are selling much more fuel to them. And since virtually all the fuel spills have stopped, we have no cleanup costs."

24. Brewer Yacht Yards

Largest Boatyard Chain in U.S. Goes Green

Location: 15 boatyards/marinas in the Northeast
Chain office: 155 East Boston Post Road, Mamaroneck, New York 10543
Telephone: (914) 698-0295 **Fax:** (914) 698-6203
Interviewed: John D. (Jack) Brewer, President
Owned by: Brewer Yacht Yard Group
States: New York (3)*, Connecticut (6), Rhode Island (4),
Massachusetts (1), Maine (1)

**Numbers in parentheses refer to the number of marinas in a state or on a waterbody.*

Environmental change

Environmental changes, promoted and supported by the owner, have advanced the nation's largest full-service boatyard chain into a leadership position in the marina industry for its care of customers and boats, clean water, and profits.

The full-service boatyard/ marina chain

Fifteen Brewer yacht yards, which form the nation's largest full-service boatyard chain, are located in five northeastern states, on 10 major waterbodies from Maine to New York. All are located in a coastal string, with each less than an hour's drive from the next, or within a 2-hour cruise by boat (with the exception of the Maine yard). The chain started with the purchase of one boatyard in 1964, then 17 more through 1995. Three of the yards—Brewer's Pilots Point, Sakonnet, and Yacht Haven—are combinations of two or three nearby marinas.

The Brewer yacht yards have a combined summer total of 3,945 slips, 200 dry

racks and 58 moorings, for a total capacity of 4,203 boats, averaging 280 per facility. The yards have a winter dry storage of 540 boats indoors and 4,000 boats outdoors. Pilots Point is the largest with 850 slips; Post Road, with 50, is the smallest. Chain-wide, about 40% of the boats are sailboats and 60% are powerboats. The sizes of the boats kept in slips range from 22 feet LOA up to 709 feet LOA, with the average around 35 feet LOA. Less than 2% of the slips are used by liveaboards. Transient slips are available at every facility. Nine of the yards have added swimming pools for customers' use. There are 10 waterfront restaurants in the chain, and all have some type of food, drink, and ice available. Fuel docks, laundry, restrooms/showers, and pumpouts are available at all Brewer yards.

Each boatyard moves boats with a one or more travel lifts, a hydraulic trailer, a crane, and a forklift. In addition to wet and dry boat storage, most facilities offer launching/haulout, fiberglass repair, carpentry, engine repair, painting, and sail/rigging repair. In 1994 Brewer contracted with the national retail chain Boater's World to

establish and lease ship's stores in 10 boatyards.

Five of the Brewer yacht yards are located on sites that have been continuously in maritime use for a hundred or more years—Brewers South Freeport (Maine), Plymouth (Massachusetts), Wickford (Rhode Island), Dauntless (Connecticut) and Post Road (New York). The Dauntless, South Freeport, and Plymouth yards have been building boats and ships since the 1700s. It is estimated that the Brewer yacht yards combined provide access to 106,250 people during each summer boating season.¹

Management measures

Brewer yacht yards achieve most of the marina management measures, including water quality assessment, habitat assessment, shoreline stabilization, storm water runoff control, fueling station design, sewage facility, maintenance of sewage facilities, solid waste, liquid materials, petroleum control, boat cleaning, and public education.

Environmental improvements

"When boaters comes to a Brewer yacht yard, they know what to expect," stated Jack Brewer. "They find a clean facility, well landscaped with flowers, floats in good condition, and free pumpouts. We treat them properly and give value for their money. Our environmental program enhances our reputation. We try to exceed the industry standards because the northeastern public wants it and marinas, as are boats, are highly visible. Our motivation [for environmental improvement] is that Brewer's want to be the best chain, with the best service, for the best customers, to make the best profit."

"Years ago," Brewer explained, "I used to think that holding tanks were stupid. I

preferred macerator-type boat toilets [MSD types I and II]. But now just the thought about all that sewage discharge into our water bothers me. I thought that we've got to start somewhere and decided to make an effort to clean up. Because we are a small but highly visible industry, we have to do it. Now all Brewer marinas have boat holding tank [MSD type III] pumpout stations, which typically cost between \$20,000 and \$30,000 each installed. Five facilities received Clean Vessel Act grants."²

"Pumpouts are free to our customers. In 1995, for example, three southern Rhode Island Brewer marinas—in Cowesett, Wickford, and Sakonnet—pumped out a total of 6,000 tanks."

Brewer Yacht Yards started making chain-wide environmental improvements in 1986 and 1987. "When I hired Captain Ed Wiegand, a retired Coast Guard officer, as the marina manager of Brewer's Mystic Marina (Connecticut), he was concerned about oil spills at our fuel docks and said the right thing to do was to have oil spill containment booms and pads available. It cost us about \$1,800 per facility. Even those without a fuel dock got spill control supplies. Each year since then we've used them once or twice chain-wide," said Brewer. "Now everyone is happy."

"In 1988-89, we all began recycling used oil. Since then 10 of the yards have purchased used oil burners (average cost \$5,000; annual saving \$2,500 year). We even tried a solvent cooker to recycle waste solvents, but it didn't work so well for us. Now all the yards have their used solvents picked up commercially, and that works well."

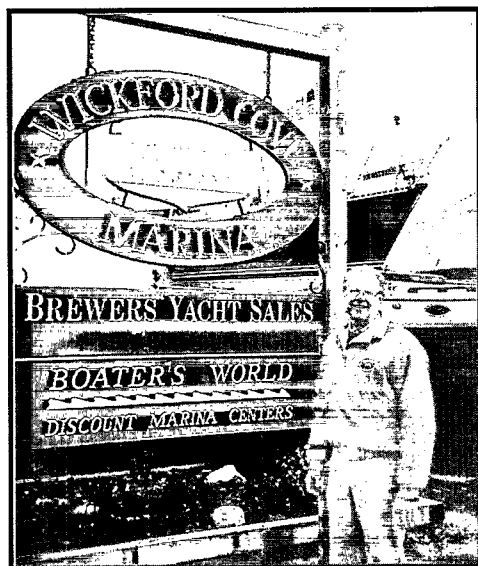
"We do three things very well and always have—boat slips, storage, and

"Our environmental program enhances our reputation. We try to exceed the industry standards because the northeastern public wants it and marinas, as are boats, are highly visible."

¹ Access for the public is estimated by multiplying the total number of boats used during the boating season (4,250) by 25, the average number of people who use a boat one or more times a season.

² See case study 4, Brewer's Cove Haven Marina

Jack Brewer, owner of Brewer Yacht Yards, stands beside the sign for Wickford Cove Marina (RI).



repairs. From the earliest days, our best profit center was slip rentals. We are very serious about service work, which averages 45% to 50% of our gross income. Slips bring 30% to 33% of the gross income, 17% to 33% comes from winter storage, and the remainder from sublet labor, fuel sales, and building rentals," said Brewer.

"Boat service and repairs are labor-intensive. Pretty much all our facilities do the same service work, including Awlgrip hull painting, carpentry, fiberglass, and mechanical and electrical repairs. Most of this work is done indoors for two reasons: to keep staff busy all winter and for environmental control. When the recession [1989-1993] came, most all marinas in the Northeast decided to get into repairs and created more competition for service. Service has slipped some over the years because of more competition and the fact that [fiberglass] boats need less service [than wood hulls]. New bottom paints, for example, need doing every 2 to 3 years, versus every year with older paints. Between 1988 and 1991 each of our facilities got pinched."

"However, we went on with our environmental improvements. Gradually all the yards will be fitted with traps to collect and filter bottom wash water. Every yard now uses high-volume/low-pressure spray guns

when painting to reduce the release of VOCs [volatile organic compounds], increasing the volume of paint that gets on the boat instead of into the air, lowering the amount of paint used, and decreasing cleanup costs."

"Realizing that the easiest part of the business is slip rentals, we decided to add extra advantages to attract customers to our marinas. Since this is a very family-oriented business, we added pools at nine facilities. Some also have exercise rooms, saunas, and hot tubs," Brewer added.

"In 1985 we began landscaping our yards. It really started when Pilots Point Marina spent almost \$6,000 to make the place a better environment. Now we are spending well over \$100,000 per year on improving the landscaping at our yards. I feel it is a good investment. If we can sell 12 to 15 more slips per marina, landscaping isn't expensive. We are attracting a better quality, upscale customer with more disposable money. They are seeking nicer marinas. After buying Yacht Haven Marina in 1995, we spent \$100,000 in landscaping. Eighty percent was spent to create a 20-foot-wide buffer strip along the 1,000-foot-long bulkhead, planted with shrubs, trees, and flowers and mulched to create a nice-looking runoff filter. Good landscaping and a clean yard make our customers, employees, and everyone feel good."

Another improvement has been to upgrade every restroom and shower in the entire boatyard chain. With most of the improvements done by each yard's staff, the managers had an informal competition to see who could create the nicest restroom. "Now we encourage all customers to use our facilities instead of their boat toilets when in our docks."

The Brewer yards have replaced most of their underground fuel tanks with aboveground tanks equipped with all proper environmental controls. Even though the average cost per marina has been \$100,000 to make the conversion and some parking spaces have been lost, aboveground tanks

are less expensive to buy and easier to monitor for spills. Eventually all will be converted.

Over the years Brewer Yacht Yards has hired environmental consultants to do safety and environmental assessments, at an annual chain-wide cost of about \$25,000. Always looking for a more cost-effective way to do business, Jack Brewer noted that "starting in 1996, we will have a trained environmental expert in-house. During the boating season he will work as the dockmaster at Pilots Point Marina, but will spend winter months visiting each yard. This way he will be kept working all year, but his winter salary will be split between all the yards, for a net saving of \$10,000. While the safety/environmental assessment part is reasonable, follow-up and implementation of the suggestions can cost considerably more and can vary from yard to yard. But it's money well spent."

Each Brewer yard actively encourages customers to visit other Brewer marinas in the northeastern chain by offering a Preferred Customer Card. This program gives each boat up to six free nights of transient dockage, preferential reservations, a 50% discount on extra dockage nights, free pumpouts, and 10 or 15 cent discounts on fuel purchased at any Brewer Yacht Yard.

To manage dog waste on docks and marina land, "pooper scoopers" are used. "Last spring, three yards—at Cowesett, Sakonnet, and Greenport—ran cleanups by customers and staff of the shores around each marina. We gave out coffee and donuts during those Saturday mornings." These events and other environmental information are promoted in *The Tide Watch*, a colorful newsletter sent out by Brewer Yacht Yards once a year to approximately 8,000 customers.

"When customers are doing their own repairs, they are strongly encouraged at most yards and required at two yards to use tarps beneath the hulls. Dustless vacuum sanders are used by all our staff and are available for rent by customers," Brewer

said. "Soon tarps and dustless sanders will be mandatory at all Brewer locations."

Generally, all Brewer yacht yards add a 1% environmental surcharge onto all work invoices. This money is earmarked for pollution prevention training, education, reducing runoff, landscaping, environmental fees, and cleanup supplies. The surcharge has provided the extra income needed to keep making improvements to the marina environment. "On the average, the 1% surcharge works well," Brewer explained. "It may be under at one location one year, but generates excess funds another year depending on what is required."

There is a saying in the industry that every marina is for sale at the right price. Jack Brewer buys them right, then improves the property and business. Being a very practical and frugal owner, he understands that the best long-term reason to improve environmental practices is that some day each yard will be sold. "If we are going to maintain the value of our property, we must make each environmentally clean. No one will buy or lend a mortgage to any marina without a clean Phase II test, including drilling and boring tests." They invest with sights on long-term return on boatyard investments.

All the Brewer Yacht Yard managers share Jack Brewer's business philosophy to run clean, neat facilities. Some managers are even more passionate about environmental protection and are proactive in their marine trade association's involvement with state coastal regulatory agencies. They all learned the lesson, during the depths of the recent recession [1989-1993], that customers do move to better facilities with good service and a clean, healthy environment. In each region, Brewer yards are generally the price leader, but they typically have the fullest slips, hard-working staff, and loyal customers.

Going green was not cheap, but clearly has been good value for Brewer Yacht Yards' business.

25. Westrec Marinas, Inc.

Clean Marina Image for World's Largest Chain

Facilities: 35 marinas owned and operated nationwide, 15 marinas managed for others, plus 10 other marinas considered Westrec Affiliates (in 1995)

Chain Office: 16633 Ventura Blvd., 6th Floor, Encino, California 91436

Telephone: (818) 907-0400 ext. 224 **Fax:** (818) 907-1104

Interviewed: William Anderson, President
James Frye, Southeastern Area Vice President
Gary Groenewold, Florida Regional Manager

Owned by: Westrec Properties, Inc.

States: Arizona, California, Florida, Georgia, Illinois, Maryland, Mississippi, New Jersey, New York, Texas, Washington, DC. *Affiliates in:* Alabama, California, Florida, Illinois, Louisiana, New Jersey, Texas, Virgin Islands, Washington

The nationwide marina chain

By all measures, Westrec Marinas is big. With a total storage capacity of 17,000 boats, and with facilities located in 12 states, the District of Columbia, and the Virgin Islands, plus Antigua, it is the world's largest full-service marina chain. Westrec's marinas are located on three coasts, a Great Lake, three man-made lakes, two major rivers, and several islands. Eleven are on fresh water and 25 on tidal salt water.

The chain started purchasing marinas in 1987. Now a totally independent corporation, Westrec in 1995 included 35 owned and operated marinas, 15 marinas managed under contract for others, and 10 affiliate marinas operated by others while receiving Westrec cooperative services. Seventy percent of the marinas are on privately owned land, whereas 30% are concessionaire marinas on government land. Half are totally owned by Westrec and half are

operated for others. Westrec's investments total over \$150 million.

The Westrec marinas have a combined total of 14,600 slips, 2,600 dry racks, and 3,000 moorings, which represent 40% of gross revenues. Holiday on Lake Lanier Marina is the largest with a capacity of 1,300 boats. Hall of Fame Marina, the smallest with a total of only 43 boat slips, caters to larger boats averaging 55 feet LOA, including 19 very large slips for megayachts up to 135 feet.¹

Chain-wide about 20% of the boats are sailboats and 80% are powerboats. The boats kept in slips range from 16 feet LOA to 135 feet LOA, with the average around 32 feet LOA. Less than 10% of the slips are used by liveaboards. Transient slips are available at every facility and represent 5% of the gross income. The most common services in Westrec marinas, in addition to

¹ See related case study 12, Hall of Fame Marina.

boat storage, are fuel dock, pumpouts, haulout by travel lift and/or forklift, boat repair services, restrooms/showers, convenience store, bait and tackle sales, laundry, and new boat sales. There are 20 waterfront restaurants in the chain, and all of the marinas have some type of food, drink, and ice service available.

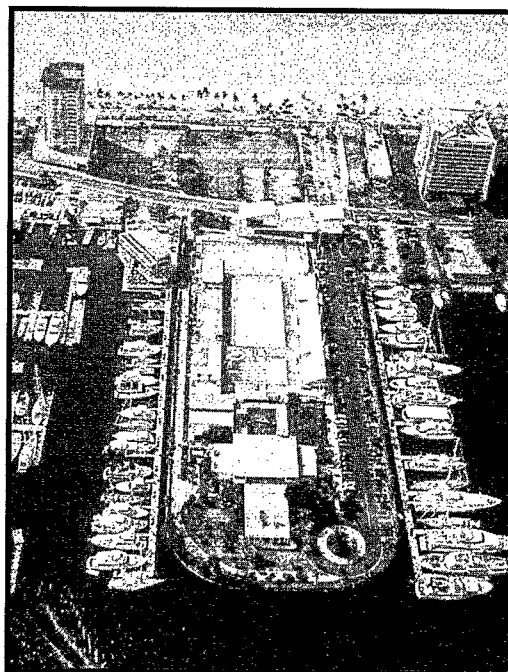
Other services available in some marinas are outboard and houseboat rentals, boat charters, sailing school, RV park, campground, resort, swimming pool, hotel, scuba diving instruction, and office space rentals. It is estimated that Westrec marinas provide boating access to 505,000 people each season, not counting the additional public access provided by their parks, hotels, restaurants, and other services.² To service all that boating public, Westrec had 1,000 full-time employees in 1995.

Management measures

Westrec marinas achieve all of the marina management measures, including marina flushing, water quality assessment, habitat assessment, shoreline stabilization, storm water runoff control, fueling station design, sewage facility, maintenance of sewage facilities, solid waste, fish waste, liquid materials, petroleum control, boat cleaning, and public education. Since marinas vary and many best management practices are site-specific, the number and kinds of BMPs used by Westrec do vary somewhat between facilities and states.

Environmental improvements

"When I became president of Westrec Marinas in 1989, I had been working for the National Park Service. That made me predisposed toward a clean environment as of critical importance to the public," explained Bill Anderson. "While designing and planning urban waterfront parks, I learned that there are ways to manage our resources, and to provide public use and



Westrec's Hall of Fame Marina (see case study #12) in Ft. Lauderdale, FL. (photo by Westrec Marina)

enjoyment of those resources without destroying them. I felt Westrec could and should balance the environmental needs with our business needs, but I didn't know where to start. In discussions with the International Marina Institute, we were given many suggestions on how to get it done. As a result, in 1993, we hired a consultant³ to do a series of studies of each marina covering issues such as compliance with the Americans with Disabilities Act, nonpoint source pollution, and stormwater pollution prevention plans. You have to make that kind of commitment for the long-term health of any marina, and especially for a large chain like Westrec."

There were three basic reasons why Westrec was motivated to make environmental changes in all its marinas.

1. Economics - "We either had to clean up or be shut down in Southern Florida," said Jim Frye. "It proved to be less costly than we expected, and was a good investment which ultimately attracted more customers to our businesses."

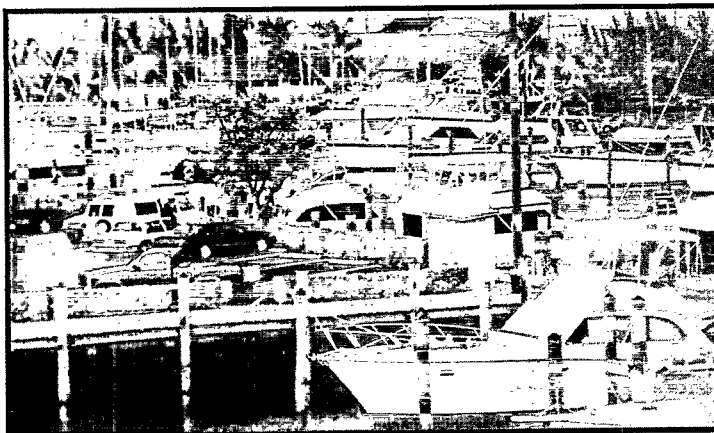
² Public access is estimated by multiplying the total number of boats used during the boating season (20,200 boats) by 25, the average number of people who use a boat at least once a season.

2. Create a clean marina company image and identity - "Our customers are very enthusiastic about our cleaner facilities, mowed green grass, and no litter. People really prefer to hang around a site that is not cluttered, but is really clean and neat," Gary Groenewold added, "and that's just the experience we at Westrec are trying to give everyone."
3. Comply with the law and regulations - "One noticeable water quality improvement, which came from relocating and filtering boat power washing, has been the elimination of rings on boat hulls. So we know we are doing something right."

"The best return on investment came from installing pumpouts and upgrading boat hull power-wash areas," said Groenewold. "We got the best publicity and good will from installing recycling bins and garbage cans with lids to control litter."

"Westrec has spent over \$200,000 to install pumpouts in all of its marinas. Of the total cost, 10% went for engineering designs and permits, 50% to buy the equipment, and 40% for construction and installation. Thus far we have received one Clean Vessel Act grant totaling \$8,000 to install one pumpout and have applied for grants to expand several others. We were way ahead of the curve and installed pumpouts in our marinas long before the grant program was available."

Westrec's Harbour Towne Marina (see case study #14) in Dania, FL.



Most of Westrec's environmental capital improvement costs were funded from cash flow. Three facilities, for now, are adding a 2.5% environmental surcharge on every bill to gradually recoup costs of compliance and improvements.

"There are some economies of scale when you get a chain as big as we are," stated Frye. "The real cost of administering environmental changes is shared. When one of us becomes aware of an issue or problem, everyone becomes aware and we share information. We can purchase supplies, such as for spill containment, in quantity and get good discounts. Should one marina have a major spill, we can quickly move staff help and equipment in from other marinas. New practices can be tried out in a few places, then those that work are taken to the others. Westrec has the resources to get its arms around an issue and to make things happen."

"South Florida has one of the strictest best management practices (BMP) standards for marinas," explained Groenewold. "But we have decided to make Westrec's Florida BMP policies transparent and the same across the country. What differs are the state regulations, interpretation, and enforcement."

Some other examples:

- All leases for commercial space in Westrec Marinas had environmental language added in 1995 about the tenant's responsibility.
- Recycling is a system-wide philosophy at Westrec. "More often than not, we are taking practices from one state and using them in other states, exceeding what is required there," said Frye.
- Fuel tank remediation has included replacing most in-ground tanks with double-walled, fiberglass tanks with vapor sniffers and overspill protection. Double-walled hoses and piping have also been installed. Spill containment equipment is now available at all Westrec fuel docks,

and some staff have been trained as first responders for oil spills.

- During all rehab and design improvements at Westrec marinas, green vegetated buffers—often lawns and plantings—are being added where possible for runoff control.
- Power wash pads for boat hulls have been moved away from the bulkhead and filters added to capture paint chips.
- In many facilities, the restrooms and showers were inadequate and have been or are being upgraded to increase customer use and satisfaction.

"Our employees are aware of Westrec's environmental policies. We discuss these issues during regular staff meetings. It is part of our company culture to be environmentally astute, to care for the environment, and to understand the need for clean water," said Anderson.

Several marinas do more and participate in regional clean water activities. For example, Allatoona Landing Marina, in Georgia, hosts an annual Lake Lanier Cleanup. Harbour Towne Marina (Florida) is one of three designated sites for the annual Intracoastal Waterway Cleanup sponsored by the Marina Industry Association of South Florida (MIASF). Hundreds of volunteers use their boats to pick up trash and litter. At Harbour Towne, they usually fill up to six 30-cubic-yard dumpsters with trash. Westrec helps sponsor the events, providing free soft drinks and hot dogs for participants.

"In 1995, we really began a market test at Harbour Towne Marina³ by instituting an environmental awareness contract. It worked so well we began using it in other full-service marinas and expect to have it implemented in all Westrec Marinas by 1996," Anderson said. "Our customers want us to be environmentally clean. In 1995 our main office in California received about 5,000 survey cards from customers

throughout Westrec's chain. These cards come directly to the president, and I read most of them personally. Nearly 20% include statements about environmental issues."

The most common themes customers mention are:

- People want to be part of a marina that is doing something good for the environment.
- They like clean water.
- They are willing to pay for clean marinas.

And Westrec generally is a price leader in its market areas.

In the future, "Westrec expects to maintain its leadership role in marina environmental awareness and regulatory compliance," Anderson said. "The bottom line is that clean marinas are good for our business."

Groenewold and Frye added, "Creating safe, enjoyable recreational experiences can't be done if the water is dirty. An important part of going boating is to enjoy the environment, to see pristine waterways free of styrofoam cups."

But they all agreed that "nationwide, the states need to be more consistent in enforcing the marina and boating regulations. Enforcement must be applied to everyone—to all marina facilities equally." But the Westrec marinas are not waiting—they choose to lead the way.

Bill Anderson concluded, "It's the duty of all marina owners to preserve this precious natural resource to the best of our ability. At the same time, we will be preserving our business as well. Marinas and clean water go hand in hand."

"The best return on investment came from installing pumpouts and upgrading boat hull powerwash areas. We got the best publicity and good will from installing recycling bins and garbage cans with lids to control litter."

³ Daniel S. Natchez and Associates, Inc., Mamaroneck, NY.

APPENDICES

- A. Literature Review and Bibliography**
- B. Amortization Schedule Explanation**
- C. Clean Marina Case Studies Listing**
- D. Discussion Worksheets**
- E. Project Press Release**

A. Clean Marinas—Clear Value Literature Review and Bibliography

Prepared by:

Impact Research Associates, Inc.

Timothy J. Tyrrell, Ph.D., Vice President

Maureen F. Devitt, Associate

September 21, 1995

Foreword

Each state within the US coastal zone has the responsibility to implement and encourage compliance with nonpoint source (NPS) pollution control measures that are mandated by Section 6217 of the Coastal Zone Act Reauthorization Amendments (CZARA) of 1990. Enforcement of such measures at marinas and recreational boating facilities is difficult. However, owners and operators of many marinas have voluntarily made environmental improvements in their operations. Case study examples of actual savings or profits realized from the application of various NPS control practices may help encourage marina owners to invest in such modifications to their operations.

With over 16.6 million recreational boats in use today, marina and boatyard facilities are in high demand. Total recreational boating business retail sales for 1994 hit \$14.1 billions showing significant recovery from the industry recession which started in 1989 and bottomed out in 1992. Of the total US population, between 21 to 31 million people are involved in some form of boating activity (fishing, power boating, water skiing, canoeing, sailing) (*Boating Industry*, 1994).

Environmental impacts to surrounding surface waters from marina-related activities can include toxicity in water, dissolved oxygen depletion, and contamination of fish and shellfish. Economic impacts of water quality degradation extend to the commercial fishing industry, water-related tourism, and nearby real estate values (Hayes et al., 1992; Kirshner and Moore, 1988). Thus, investments in water quality controls at the roughly 9,000 marinas and boatyards in the United States may realize environmental and economic benefits beyond the marina and boating industries (*Boating Industry*, 1994).

After an extensive search, it was determined that very little public literature is available that documents firm level benefits and costs from investments in environmental improvements. A 1992 EPA study estimated the costs of NPS control measures to marinas, but did not consider possible benefits from such investments. A 1986 publication from the Institute for Local Self-Reliance documents in case study format the benefits and costs of pollution prevention measures to companies in the chemical and manufacturing industries. Finally, there is currently an effort within the hotel industry, spearheaded by a hotel management consulting firm, to reform hotel management practices to become environmentally friendly through reducing waste and conserving energy and water.

Each of these four references is summarized here, along with comments on their usefulness for the "Clean Marinas—Clear Value" study.

Annotated Literature Summary

a. Jellicorse, Brenda L., J.M. Duffin, E.S. Newbold. *Economic Analysis of Coastal Nonpoint Source Pollution Controls: Marinas*. Prepared for: US Environmental Protection Agency. Prepared by: Center for Economics Research, Research Triangle Institute, Research Triangle Park, NC. September 1992.

Summary: This Jellicorse et al. (1992) study estimates the costs of nonpoint source (NPS) pollution control measures to coastal marinas. The analysis is conducted through hypothetical scenarios of various management practices. The report first reviews the sources and impacts of NPS pollution related to

marina operation, and characterizes the design and distribution of marinas in the US coastal zone.

Jellicorse et al. establish six hypothetical "model" marinas of varying size, location, services provided, and financial standing to represent the types of marinas found in the coastal zone. Costs of implementation are estimated for three management scenarios, each gradually more stringent in number and type of control measures. NPS controls were specified in the general categories of: siting and design, storm water runoff, sewage disposal, and operations and maintenance. Costs of implementation were estimated to vary between less than 1% of sales up to 8% of sales for privately owned marinas, depending on the management scenario and the characteristics of the marina.

Comments: Jellicorse et al. (1992) is the primary existing source of cost analysis of the implementation of nonpoint source (NPS) pollution control measures at US coastal marinas.

Because marina owners would not provide the financial information necessary to conduct the analysis as a case study, the authors alternatively set up hypothetical marinas to estimate costs. Without the availability of a case study analysis, it is not possible to predict potential financial benefits to marina owners from implementation of environmentally sound management practices.

b. Huisingh, Donald, L. Martin, H. Hilger, N. Seldman. Proven Profits from Pollution Prevention: Case Studied in Resource Conservation and Waste Reduction. Institute for Local Self-Reliance. Washington, DC, 1986.

Summary: Huisingh et al. present a compilation of case studies of companies that have invested in waste reduction, resource conservation, and other pollution-preventing management measures. The focus is on hazardous waste management issues in the manufacturing and chemical industries. The volume is set up as guidebook to inform other manufacturing and chemical companies about various pollution prevention measures, and the potential benefits that can be realized through investment in, and implementation of these measures.

The case studies were compiled by distributing a questionnaire to companies in the chemical and manufacturing industries. Results are reported in a standardized, easy-to-follow format. Each case study provides a summarized project description, economic benefits (profits or savings per year) and costs (initial investment or cost per year), and environmental and health benefits associated with the company's investment. Where economic information was not available or not estimable, a verbal description of the impact is provided (improved productivity or improved product quality).

One company that invested an initial \$4.3 million in equipment to recycle a fluoride manufacturing by-product now saves \$1.35 million per year in materials, waste disposal, and pollution control costs. Another invested just over \$3,000 to recycle solvents and switch to water-based cleaners in the manufacturing process, and now saves approximately \$20,000 per year in raw materials and waste disposal costs. Other examples are less dollar-specific, but recognize costs savings, and environmental and health benefits associated with the changes made.

Comments: This book provides actual examples of profits and savings from resource-conserving and waste-reducing investments. It will potentially encourage manufacturing and other companies to invest in pollution prevention measures without the use of government intervention/incentive policies. A comparable book for the marina industry can encourage investments to reduce nonpoint source pollution in the coastal zone.

c. Curtis, Sara. "Seeing the Forest and the Trees." Hotelier. September/October 1992. pp. 11-14. Canadian Pacific Hotels & Resorts. Company prospectus. Toronto, Ontario, Canada.

Summary: The largest hotel company in Canada, Canadian Pacific Hotels & Resorts, developed "The Green Partnership Guide" for its 27 hotels across the country. The 129-page guide book was made

available to all managers, with suggestions for environmental improvements in all departments at each hotel including: waste disposal, laundry, kitchen, grounds, plant management, stores, housekeeping, repairs and renovations, food service, and golf course management. The initial ideas for savings/improvements came from workers in each of these departments by way of a questionnaire. One of the chain's hotels incurred an initial outlay of \$100,000 to implement some of the suggested practices, and netted \$250,000 in savings.

Comments: Canadian Pacific has outlined many examples of cost savings at its hotels throughout the country, including savings on energy costs and waste disposal costs. In addition, the chain as a whole received a great deal of publicity from the implementation of this "environmentally-friendly" program. At least seven different publications covered the story of the company's innovative environmental policies. The benefits that Canadian Pacific realized from this "free" positive publicity are unknown. However, many companies pay thousands of dollars for equivalent advertising space.

d. Dela Cruz, Tony. "Two Years After Bombing, Vista Reopens as First Ecotel." *Hotel Business*. November 14, 1994. pp. 1b, 18b.

HVS Eco Services. "Environmental and Energy Consulting for the Hotel Industry Awards the ECOTEL Certification." *Company prospectus*. Mineola, New York.

Summary: In Fall of 1994, the New York Vista Hotel was the first company to be awarded an "ECOTEL" certification from HVS Eco Services. HVS Eco Services awards an "ECOTEL" designation to hotels that have exhibited environmentally stringent management practices.

HVS Eco Services recently established the ECOTEL "green seal" of approval to recognize hotels for excellence in the areas of solid waste management, water conservation, energy efficiency, compliance with federal and state regulations, and education and training for employees. A May 1995 news release from the Mineola, New York, company announces the certification of two more hotels, one in Florida and the other in Pennsylvania. Each certified hotel becomes part of an ongoing promotional campaign, and will be listed in a directory of ECOTEL that is distributed to travel agencies and tour operators around the world.

The HVS prospectus provides estimates of the costs and annual savings for hotel installation of: recycling, energy-efficient lighting fixtures, heating insulation, and water-saving devices. Even investments as large as \$2 million for convention-size hotels were estimated to have a payback period of less than 2.5 years, with net savings after 5 years of over \$700,000.

Summary and Conclusions

Very little literature exists which provides case studies of firm-level benefits and costs of investing in pollution prevention measures. A 1992 study prepared for EPA estimates the costs of nonpoint source (NPS) pollution control to coastal marinas by using hypothetical scenarios of various management practices. This study makes it clear that there are many variables to consider when estimating the costs of control devices and measures for NPS pollution. Thus, costs for a "generic" marina cannot be estimated. With the case study approach, actual costs can be reported, and benefits associated with the investment/changes can be estimated. An extensive and diverse sampling of marina costs and benefits from pollution control measures may provide the impetus for other marina owners around the country to invest in such sound practices.

Only one compilation of case studies provides actual examples of profits and savings from resource conserving and waste reducing investments. Presentation of case studies in the marina industry may perhaps be modeled after this industry guidebook, published by the Institute for Local Self-Reliance.

Finally, the marina industry may consider the current movement within the hotel industry to establish a green seal of approval for environmentally sound management of individual hotels. Such an

award system carries with it a sense of pride that may encourage marina owners to "join the ranks" of those who are investing in better management practices. Positive publicity (local or national) may be an added bonus to marinas that make these investments. Marketability of environmental improvements can help establishments regain, and even profit from their investments.

Other References

Boating Industry Magazine. The BOATING BUSINESS - 1994 Annual Industry Review. Argus Business, Atlanta, GA. 1994.

Hayes, K., T. Tyrrell, and G. Anderson. "Estimating the Benefits of Water Quality Improvements in the Upper Narragansett Bay." Marine Resource Economics. 1992. v. 7. pp. 75-85.

International Marina Institute. National Marina Index - Marina Industry Financial Performance. Quarterly Report. January 1990.

Kirshner, D., and D. Moore. "The Effect of San Francisco Bay Water Quality on Adjacent Property Values." Environmental Defense Fund. Oakland, CA. unpublished. 1988.

Ofiara, D.D., and B. Brown. Marine Pollution Events of 1988 and Their Effect on Travel, Tourism, and Recreational Activities in New Jersey. Bureau of Economics Research, Rutgers University. New Jersey. March 1989.

Rorholm, N., and D. Burrage. Economic Impact of the Rhode Island Boating Industry. University of Rhode Island Department of Resource Economics. Sea Grant Report. 1983.

B. Amortization Schedule Explanation

To standardize the allocation of capital costs for new marina equipment and facilities over their useful life time, an annualized value has been calculated for this report based on the commonly used number of years the item will last, and at an assumed interest rate of 5%. The average annualized cost (R), which is equivalent to a one-time cost (A), is calculated by:

$$R = \frac{A}{IF_{PVA(n,r)}}$$

$IF_{PVA(n,r)}$ is the Present Value Annuity Interest Factor for n years and an interest rate of r .

The formula for the interest factor is:

$$IF_{PVA(n,r)} = \frac{1 - \frac{1}{(1+r)^n}}{r}$$

For this set of case studies, investments were assumed to last 5, 10, or 20 years, and with an interest rate assumed to be 5%.

The Interest Factors for these three ranges are:

Years:	5	10	20
$IF_{PVA(n,r)}$	4.329	7.722	12.462

The interest factors were used in Table 3, Costs/Benefits of Clean Marina Examples, to calculate the numbers in column "annualized cost of investment"

Examples of years used for calculating amortized marina write off.

5 years:	Dustless sanders, Closed loop sand blaster
10 years:	Pumpouts, Recycling equipment, Fuel pumps, Personal water craft fueling dock, Pressure wash equipment
20 years:	Oil burner, Inground tanks, Permeable parking surface, Breakwaters

C. Clean Marina Case Studies Listing¹

CALIFORNIA

- **Westrec Marinas, Inc.**, HQ: Encino, CA Case study 25
William Anderson, President
818-907-0400x224, fax 818-907-1104
50+ marinas nationwide, overseas

CONNECTICUT

- **Cedar Island Marina**, Clinton, CT Case study 6
Jeffrey Shapiro, President
860-669-8681
Full-service marina
- **Deep River Marina**, Chester, CT Case study 8
Doug and Karen Van Dyke, Owners
860-526-5560
Full-service marina

FLORIDA

- **Associated Marine Technologies**, Dania, FL Case study 2
Scott Miser, Owner; Ted James, General Manager
305-926-0308, fax 305-926-7834
Full-service boatyard
- **Hall of Fame Marina** (a Westrec Marina), Fort Lauderdale, FL Case study 12
Bob Koerber, Dockmaster
954-764-3975, fax 954-779-3658
Megayacht marina
- **Harbour Towne Marina** (a Westrec Marina), Dania, FL Case study 14
Gary Groenewold, Florida Regional Manager
954-926-0300, fax 954-922-5485
James Frye, Regional Vice President
954-920-7225, fax 954-920-7339
Full-service marina
- **Summerfield Boat Works**, Fort Lauderdale, FL Case study 21
Tom Correll, General Manager
305-525-4726, fax 305-525-8613
Full-service boatyard and marina

ILLINOIS

- **West Access Marina**, Carlyle, IL Case study 22
Richard Golding, General Manager
618-594-2461, fax 618-594-2226
Full-service marina

¹Listed alphabetically by state.

INDIANA

- **The Hammond Marina**, Port Authority, Hammond, IN Case study 13
Bob Nelson, Marina Director
219-659-7678, fax 219-659-7679
Municipal marina

MARYLAND

- **Port Annapolis Marina**, Annapolis, MD Case study 19
David Goshman, General Manager
410-639-2762, fax 410-269-5856
Full-service marina

MASSACHUSETTS

- **Edwards Boatyard**, East Falmouth, MA 02536 Case study 9
Charles Swain, President
508-548-2216, fax 508-457-9140
Full-service boatyard/marina

MICHIGAN

- **Kean's Detroit Yacht Harbor**, Detroit, MI 48214 Case study 15
John Kean, Owner
313-822-4500, fax 313-822-5442
Full-service marina

MISSOURI

- **The Lodge of Four Seasons Marina**, Lake Ozark, MO 65049 Case study 17
Clay Huntress, Manager
573-365-8540, fax 573-365-8547
Full-service marina

NEW JERSEY

- **All Seasons Marina**, Mamora, NJ Case study 1
Ralph Dilks, Owner
609-390-1850, fax
Full-service marina
- **Green Cove Marina**, Brick, NJ Case study 11
Al Davidson, President
908-840-9090, fax
Full-service marina
- **Lockwood Boat Works**, Perth Amboy, NJ Case study 16
Bill Lockwood, General Manager
908-721-1605
Full-service marina
- **Winter Yacht Basin**, Mantoloking, NJ Case study 23
Ken Winter, President
908-477-6700
Full-service marina

NEW YORK

- **Brewer Yacht Yards** (15 yards), HQ: Mamaroneck, NY Case study 24
Jack Brewer, Jr., President
914-698-0295, fax 914-698-6203
15 marinas New York to Maine

OHIO

- **Battery Park Marina**, Sandusky, OH Case study 3
Carl Wolf, General Manager
419-625-6142, fax 419-625-7529
Urban marina

PUERTO RICO

- **Puerto del Rey Marina**, Fajardo, Puerto Rico Case study 20
Daniel Shelley, President
809-860-8880, fax 809-860-7592
Full-service marina resort

RHODE ISLAND

- **Brewer's Cove Haven Marina**, Barrington, RI Case study 4
Michael Keyworth, General Manager
401-246-1600, fax 401-246-0731
Full-service boatyard/marina
- **Conanicut Marine Services, Inc.**, Jamestown, RI Case study 7
William Munger, President
401-423-1556, fax 401-423-7152
Full-service marina, inland boatyard

WASHINGTON

- **Cap Sante Marina**, Port of Anacortes, Anacortes, WA Case study 5
Dale Fowler, Harbormaster
360-293-0694, fax 360-299-0998
Municipal marina
- **Elliott Bay Marina, Inc.**, Seattle, WA Case study 10
Martin Harder, General Manager
206-285-4817, fax 206-282-0626
Urban megamarina
- **Oak Harbor Marina**, Port of Gig Harbor, Oak Harbor, WA Case study 18
David Williams, Harbormaster
360-679-2628, fax 360-240-0603
Municipal marina

Case study total: 25
States and territories included: 15

D. Discussion Worksheets

- **Clean Marina Facility Notes**
- **Marina's Environmental Improvement**
- **Clean Marina Cost/Benefit Worksheet**

Clean Marina Facility Notes

Date of discussion visit: 1995

Facility name:							
Address				State		Zip	
City				Fax			
Telephone							
Person contacted:				Title:		Owner	Pres.
Volunteered or Nominated by:				VP		GM	
Owner name:							
Address				State		Zip	
City				Fax		E-mail	
Telephone							

Type of facility: circle primary description

Marina	Boatyard	Full service marina/yard
Yacht Club	Docks	Mooring field
Landing	Fuel dock only	Boat ramp

This marina is best described as a:

Home port Destination Stop-off for transients

Facility ownership:

Private commercial	Private nonprofit club	Public agency
Other (describe)		

Number of employees in boating season: Full time Part time Year round: Full time
 Boating storage capacity in boating season: Slips Moorings Racks Out of water = Total
 (not winter storage)

Percent 1995 boating storage capacity in use/sold: %

Boats size range: smallest boat avg size boat largest boat
 % sailboats % powerboats

Types of facility services & profit centers: circle all that apply

Slips	Moorings	Rack storage	Land storage	Transient dockage
Launch, haul out	Dock sales	Boat rental, charters	Yacht club	Fishing pier
Glass/hull repair	Engine repair	Sail/rigging repair	Painting	Canvas/sail making
Electronic sales/service	Welding/metal fabrication	Bottom cleaning	Boat sales, new	Brokerage, used
Trailer sales	Retail store	Bait/tackle sales	Fuel dock	Pumpout
Laundry	Food, drinks, ice	Restaurant	Lodging, hotel	Resort
Campground	Pool Beach	Golf Tennis		
Boat handling equipment:	Travel lift	Hydraulic trailer	Crane Forklift	Marine railway
Restrooms available on site:	Yes	No	Nearby (where)	

Most customers use this marina:

Year-round Seasonal Transient visitors

Number of liveaboard (residential) boats:

None Liveaboard boats

On a busy weekend, typical percent of boats

% Used/occupied/away % Sleeping overnight

Name of water body at facility:

Number of other marina facilities within 2 mile radius:

Estimated total boat population within 2 mile radius: Under 200 200-500 500-750 750-1,000
 (include own customers in total) 1,000-2,000 2,000-4,000 >4,000+

Boating season months of: All year, or just in: Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

(season can also be defined to start with month of launching to final haulout month)

Facility history - give year: (circa)

Marina built Bought by present owner

First maritime use of shore was in (year or circa):

16 17 18 19

Shipyard/boatyard Commercial shipping Ferry dock Fuel terminal

Naval base Fishing port

rev. 9-18

Marina's Environmental Improvement

Change made, describe prime example

Date change made/program started: (month) _____ 19__

Public/boater environmental education via: Fact sheet Newsletter Signs
Press release Demonstrations Courses, training Contract agreement

Beneficial results to: (describe)

- o Environment
- o Business
- o Customers
- o Public
- o Government
- o Other

Note: To the degree possible, economic analysis in this marina will compare business costs to benefits, with and without the environmental practice adopted. In cases with non-income benefits, such as public education, other types of benefit descriptors will be identified. All findings will be based on information provided by the facility owner/manager, and when hard numbers are not available, professional estimates will be accepted.

Costs: USE WORKSHEET TO CALCULATE	circle if numbers given are:	actual	estimate
Total installation/change cost (include design, permits, equipment, labor, other)		\$	
Total annual operation/maintenance cost (include labor, supplies, replacement parts, other)		\$	
Revenues:	circle if numbers given are:	actual	estimate
New/additional income from increased number of customers, more		\$	
traffic & sales; grant received, other			
Cost avoided/reduced, in-kind benefits value, income saved (not lost to others), other		\$	
Value of public recognition, press/TV coverage, extra publicity, new permit, other		\$	
How would current income/costs change if improvement was stopped or not done originally?		\$	

If pumpout service: charge per use: \$ _____ total number of pumpouts in past year _____ est. volume septage _____ gal

Advice to others - What would be done differently next time to improve effect and benefits?

Other environmental improvements made.

Runoff control Vegetated buffer Permeable parking Pressure wash trap/filters Designated hull work area Pumpout Dump station Restroom upgrade

Oil spill gear Improved fueling Oil bilge pads Fish cleaning station Recycling: oil paper cardboard plastic glass metal wood batteries

Contract language for: Customers Outside contractors

- o Does marina have NPDES storm water permit? Yes No None required
- o Does marina have any CZM/environmental cease & desist or violations pending? Yes No
- o Need Photographs of improvement; action shots with people, boats, work in progress. Send brochure, contracts, newsletter, articles.

Management Measures (CZARA NPS) **CIRCLE all MMs in USE**

- | | | | | |
|---|------------------|---------------------|--------------------------------|--------------|
| 1. Siting and design: | a. Flushing | b. WQ assessment | c. Habitat | d. Shoreline |
| | e. Storm water | f. Fuel station | g. Sewage facility | |
| 2. Marina/boat operation/maintenance: control | a. Solid waste | b. Fish waste | c. Liquid material | d. Petroleum |
| | e. Boat cleaning | f. Public education | g. Sewage facility maintenance | |

Clean Marina Cost/Benefit Worksheet

Discussion worksheet for estimating bottom line economic benefits.

Marina's name: _____				
Environmental improvements: _____				

Installation/Change Costs	Actual or Best Estimate	Estimate ± \$ Range	Comments
Design	\$	\$	
Permits	\$	\$	
Equipment	\$	\$	
Labor	\$	\$	
	\$	\$	
	\$	\$	
	\$	\$	
Total	\$	\$	

Annual Operation/Maintenance Costs			
Labor	\$	\$	
Supplies	\$	\$	
Replacement Parts	\$	\$	
	\$	\$	
	\$	\$	
Total	\$	\$	

New Revenue/Cost Saved			
New income	\$	\$	
Income saved (not lost to others)	\$	\$	
Costs avoided/reduced	\$	\$	
Grant received	\$	\$	
In-kind benefit value	\$	\$	
Publicity, recognition value	\$	\$	
New permit value	\$	\$	
	\$	\$	
	\$	\$	
Total	\$	\$	

E. Project Press Release

Release: June 9, 1995

Neil Ross Consultants, Kingston, RI
for further information call: 401-782-2116

Volunteers Needed for Clean Marinas—Clear Value Study

Many marinas and boatyards have discovered economic benefits from cleaner business operations, and their success stories now will be told to the nation. Marine Trade Associations across America are asked to recruit volunteer facility managers to be interviewed during a summer long study of clean marinas with clear benefits from their environmental improvements. Those selected will receive national recognition.

Here are two examples of marinas that found unexpected environmental savings and profits after changing to cleaner operations.

- *When a full service marina, on a middle America lake, switched to dustless vacuum sanders, bottom work productivity jumped over 60 percent.*
- *A New England coastal boatyard, after installing a pumpout station installed with a government grant, saves \$2,000 annually off sewer bills by metering the waste sent to the municipal sewer plant.*

Each benefited five ways: increased productivity or cost saving, environmental guideline compliance, pride in accomplishment, happier customers, and cleaner waters. And because their marinas are cleaner, they work harder to make them cleaner still, AND that has attracted more new customers, who feel better about being part of the solution to water pollution.

Clean Marinas—Clear Value is the name of this project being conducted by Neil Ross, under a subcontract to Tetra Tech Inc. *"The purpose of this nationwide effort is to identify marina and recreational boating operations that have adopted best management practices and programs,"* said Ross, *"which have resulted in positive economic benefits. We want to promote as many good examples as possible to our industry, government regulators, and the boating public. To make this happen, volunteers are needed. Or if you know a marina with a good environmental story to tell, please call to nominate them for an interview."*

A simple comparison of each marina, before and after environmental improvements, will be made to verify that differences and economic benefits are connected. A positive relationship is intended to support the premise that 'clean' marinas will generate clear economic values. Benefits can be measured in terms of new income derived from increased sales, services, and slip rentals; cost savings from improved housekeeping procedures; increased public visitation and participation due to site cleanliness, attractiveness and clean water.

The U.S. Environmental Protection Agency has become interested in these economic benefits through discussions held at the national series of Marina Environmental Workshops being taught by Neil Ross for the International Marina Institute with EPA grants. Marina and boatyard operators who have realized benefits through implementation of best management practices (BMP) will be called or visited by Ross. Information and photographs collected will be shared with EPA and the industry nationwide.

For information about volunteering or nominating clean marinas for consideration and interviews, contact Neil Ross Consultants (NRC) at: PO Box 56, Kingston, RI 02881 (tel./fax 401-782-2116, or email: neilross@aol.com) as soon as possible. Deadline for consideration is early August.

- end -

