Chapter 9
Changes in Our Coastal Communities
-Population Growth, Development and Water Quality

9.1 Our Changing Waterfronts

Waterfronts in North Carolina are changing. Historic landmarks for those that have been born and raised on the waterfronts are disappearing; as are fish houses and fishing fleets. These historic uses of waterfronts are being replaced with "urban waterfronts". Morehead City and other waterfronts are redeveloping into waterfronts more like Wilmington's waterfront – the state's only designated "urban waterfront". Redevelopment projects on historically working waterfronts include activities such as restaurants, condominiums and mixed-use buildings. Fishing fleets are being replaced by yachts, charter boats or sport fishing boats. Property values are soaring making it a challenge for historic waterfront businesses to stay in operation, when selling the business and property is more profitable. Reports of median selling prices for soundside lots on Hatteras Island jumping from $82,000 in 1998 to $412,000 in 2005 are not uncommon. Profits like these are hard to turn down, but with these selling prices comes a change of community structure and history. Even smaller coastal communities are feeling the brunt of coastal redevelopment for residences and businesses near the water. While land closest to the ocean has seen the first wave of development, the second and third waves of development on the sound and tidal creeks are already here.

Those whose livelihood depends on water access and good water quality are affected by this redevelopment. Fisherman, seafood distributors and processors and others that make their living from the waters are concerned. Public demand for water resources is growing, yet the ability to provide these resources is diminishing. Along the waterfront in Morehead City, fish houses have closed and redevelopment is planned or constructed in their place; the fishing industry for market, once the stronghold of the city, is being replaced by the recreational fishing industry.

Shellfish, once a significant economic resource for North Carolina fisherman, have declined over the years. The oyster industry adds less than $1 million per year to the state's economy. But as the oysters and clams are lost, so too are their water purification capabilities. Oysters, for example, pump up to 50 gallons of water per day through their gills; filtering sediment and other pollutants as they take water in and pump the water clean. Shellfish populations have decreased due to pollution, diseases, hurricanes, loss of oyster reefs and overfishing. (See Chapter 14 for harvest reports)

9.1.1 Loss of Access to Public Use of Coastal Waters

North Carolina citizens and elected officials are concerned about the loss of working waterfronts, as fewer marinas and fishing piers are available for public access. The North Carolina Marine Fisheries Commission (MFC) recently passed a resolution asking that state leaders "recognize the vital importance of public access to State estuarine and marine fisheries and waters". A resolution was also created and signed by scientists, authors and educators to preserve "the cultural integrity and economic significance" of the commercial fishing industry in the state. These resolutions were presented to the Joint Legislative Commission on Seafood and Aquaculture for further action in 2006.

The Coastal Resources Commission (CRC) attempts to not only protect Public Trust Waters as provided for by the Coastal Area Management Act (CAMA), but also attempts to encourage public access to these waters. Recognizing the demand for residences along coastal waters and seeing the threat of loss of public access to these waters, the CRC at its March 2006 meeting requested that a resolution be sent supporting the Joint Legislative Commission on Seafood and Aquaculture efforts to identify ways to ensure public access to coastal waters is preserved. The resolution calls for the creation of a Waterfront Access Study Committee to support efforts to preserve the cultural integrity and character of eastern North Carolina.

The Waterfront Access Study Committee was to study the degree of loss and potential loss of the diversity of uses along the North Carolina coastal shoreline, and how these losses impact access to the public trust waters of the state. The Committee asks for the cooperation of municipalities, public agencies, resource and facility-development granting entities, coastal developers, businesses, and other coastal resource users to recognize and integrate enhanced waterfront-use diversity and increased public access as beneficial factors and/or criteria in their decision making. The Committee supports the use of limited public funds to achieve enhanced water quality, protection of natural and cultural/maritime heritage sites and resources, and maintaining or advancing waterfront-use diversity and public access. A final committee report is available online at: *www.ncseagrant.org/waterfronts*.

Florida and Maine Initiatives

The loss of public waterfront access and the decline in marina facilities and fishing piers prompted Florida and Maine to put a moratorium on waterfront development projects until a regional planning council could develop a preservation plan to preserve working waterfronts. Florida passed the "Working Waterfront Protection Act" to allow towns to defer property taxes and re-assessments for working waterfronts. This law also requires land use plans to preserve "property that provides access for water-dependent commercial activities" such as docks, fishing facilities and ramps. Maine voters amended the state constitution to allow property used for commercial fishing activities to be tax assessed based on its current use rather than development potential, and also approved funding for the purchase of working waterfront properties. Maine elected officials are also pursuing legislation such as the "Working Waterfront Preservation Act" to make grants available to help purchase or maintain working waterfront properties.

9.2 Effects of Population Growth and Development

Based on the 2000 Census, the overall population of the White Oak River basin is 311,680. This number is estimated based on the percent of the county land area that is partially or entirely contained within the White Oak River basin. North Carolina's coastal counties are some of the fastest growing areas in the state and the associated development is impacting water quality. Two of the four counties in the basin are expected to experience growth rates in excess of 13 percent by 2020 (Table 44). As the White Oak River basin continues to grow, there will be a loss of natural areas and an increase in the amount of impervious surfaces associated with new homes and businesses. Impacts are quickly felt with population growth, resulting in an increase in runoff from roads and new developments, wastewater treatment, a change in the shoreline fronts to development, reduced public access to waterfronts, beach closures and a decline in water quality. County population data present county growth estimates based on Office of State Planning information (September 2004). Counties with the highest expected growth are associated with the largest municipal areas and the most densely populated subbasins in the basin.

Table 44 County Population and Growth Estimates

County	Percent of County in Basin	1990 Population	2000 Population	Estimated % Growth 1990-2000	Estimated Population 2020	Estimated % Growth 2000-2020
Carteret	49	52,407	59,383	**11.7**	69,000	**13.9**
Craven	4	81,812	91,523	**10.6**	96,449	**5.1**
Jones	19	9,361	10,419	**10.2**	10,499	**0.8**
Onslow	77	149,838	150,355	**0.3**	178,563	**15.8**
Total		293,418	311,680	**5.9**	354,511	**12.1**

Urban growth poses one of the greatest threats to aquatic resources more than any other human activity. Greater numbers of homes, stores, and businesses require greater quantities of water. Growing populations not only require more water, but they also lead to the discharge and runoff of greater quantities of waste and pollutants into the state's streams and groundwater. Thus, just as demand and use increases, some of the potential water supply is lost (Orr and Stuart, 2000).

Population fluctuations occur in developing coastal communities as seasonal changes bring time-share and rental property residents, creating an increased demand on municipal resources and natural resources. County, city and town planners need to account for these fluctuations and recognize that temporary residents may have less incentive to invest in sustainable community development efforts. Table 45 below presents population data from Office of State Planning for municipalities located wholly or partly within the basin. Data presented by municipality summarize information on past growth of large urban areas in the basin.

Table 45 Municipal Population and Growth Trends

Municipality	County	1980 Population	1990 Population	2000 Population	Percent Change (1980-1990)	Percent Change (1990-2000)
Atlantic Beach	Carteret	941	1938	1781	**51.44**	**-8.8**
Beaufort	Carteret	3826	3808	3771	**-0.47**	**-1.0**
Bogue	Carteret	…	351	590	**…**	**40.5**
Cape Carteret	Carteret	944	1013	1214	**6.81**	**16.6**
Cedar Point	Carteret	479	628	929	**23.73**	**32.4**
Emerald Isle	Carteret	865	2434	3488	**64.46**	**30.2**
Indian Beach	Carteret	54	153	95	**64.71**	**-61.1**
Morehead City	Carteret	4359	6046	7691	**27.90**	**21.4**
Newport	Carteret	1883	2516	3349	**25.16**	**24.9**
Peletier	Carteret	…	304	487	**…**	**37.6**
Pine Knoll Shores	Carteret	646	1360	1524	**52.50**	**10.8**
Jacksonville	Onslow	18259	30398	72,873	**39.93**	**58.3**
North Topsail Beach*	Onslow	301	947	843	**68.22**	**-12.3**
Richlands	Onslow	825	996	928	**17.17**	**-7.3**
Swansboro	Onslow	976	1165	1459	**16.22**	**20.2**
Maysville	Jones	877	892	1002	**1.68**	**11.0**

* Indicates the municipality is located in more than one river basin.

As development in surrounding metropolitan areas consumes neighboring forests and fields, the impacts on rivers, lakes, and streams can be significant and permanent if stormwater runoff is not controlled (Orr and Stuart, 2000). As watershed vegetation is replaced with impervious surfaces in the form of paved roads, buildings, parking lots, and residential homes and driveways, the ability of the environment to absorb and diffuse the effects of natural rainfall is diminished. Urbanization results in increased surface runoff and correspondingly earlier and higher peak streamflows after rainfall. Flooding frequency also increases. These effects are compounded when small streams are channelized (straightened) or piped, and storm sewer systems are installed to increase transport of stormwater downstream. Bank scour from these frequent high flow events tends to enlarge urban streams and increase suspended sediment. Scouring also destroys the variety of habitat in streams, leading to degradation of benthic macroinvertebrate populations and loss of fisheries (EPA, 1999).

9.2.1 Changes in Land Cover

Land cover can be an important way to evaluate the effects of land use changes on water quality. Unfortunately, the tools and database to do this on a watershed scale are not yet available. Land cover information from the National Resources Inventory (NRI) published by the Natural Resource Conservation Service (NRCS) is presented only at an 8-digit hydrologic unit scale. This information is presented to provide a picture of the different land covers and developing land use trends in the White Oak River Basin.

Land cover information in this section is from the most current NRI, as developed by the NRCS (USDA-NRCS, June 2001). The NRI is a statistically based longitudinal survey that has been designed and implemented to assess conditions and trends of soil, water and related resources on the Nation's nonfederal rural lands. The NRI provides results that are nationally and temporally consistent for four points in time -- 1982, 1987, 1992 and 1997.

In general, NRI protocols and definitions remain fixed for each inventory year. However, part of the inventory process is that the previously recorded data are carefully reviewed as determinations are made for the new inventory year. For those cases where a protocol or definition needs to be modified, all historical data must be edited and reviewed on a point-by-point basis to make sure that data for all years are consistent and properly calibrated. The following excerpt from the *Summary Report: 1997 National Resources Inventory* provides guidance for use and interpretation of current NRI data:

> *The 1997 NRI database has been designed for use in detecting significant changes in resource conditions relative to the years 1982, 1987, 1992 and 1997. All comparisons for two points in time should be made using the new 1997 NRI database. Comparisons made using data previously published for the 1982, 1987 or 1992 NRI may provide erroneous results because of changes in statistical estimation protocols, and because all data collected prior to 1997 were simultaneously reviewed (edited) as 1997 NRI data were collected.*

Table 46 summarizes acreage and percentage of land cover from the 1997 NRI for the major watersheds within the basin, as defined by the USGS 8-digit hydrologic units, and compares the coverages to 1982 land cover. Definitions of the different land cover types are also presented.

Forest and wetlands (both private and federal forests) cover approximately 62 percent of the basin. The water category covers approximately 19 percent. Agriculture (including cultivated and uncultivated cropland and pastureland) covers approximately 16 percent of the land area. The urban and built-up category comprises roughly 2.5 percent and exhibited a dramatic change since 1982. Cultivated cropland and forestland cover both decreased in the basin. Uncultivated cropland and pastureland cover had the most significant changes.

Table 46 Major Watershed Areas

LAND COVER	MAJOR WATERSHED AREAS *								
	New River Watershed		Bogue-Core Sounds Watershed		1997 TOTALS		1982 TOTALS		% Change since 1982
	Acres (1000s)	%	Acres (1000s)	%	Acres (1000s)	% of TOTAL	Acres (1000s)	% of TOTAL	
Cultivated Crop	12.4	3.5	45.5	5.7	57.9	5.0	67.0	5.8	-13.6
Uncultivated Crop	0.0	0.0	5.0	0.6	5.0	0.4	0.0	0.0	500.0
Pasture	4.2	1.2	1.7	0.2	5.9	0.5	1.7	0.1	247.1
Forest	207.4	58.5	144.4	18.1	351.8	30.5	381.3	33.1	-7.7
Urban & Built-Up	38.6	10.9	51.0	6.4	89.6	7.8	54.1	4.7	65.6
Federal	48.0	13.5	163.3	20.5	211.3	18.3	211.2	18.3	0.0
Other	43.9	12.4	386.9	48.5	430.8	37.4	437.0	37.9	-1.4
Totals	354.5	100.0	797.8	100.0	1152.3	100.0	1152.3	100.0	---
% of Total Basin	---	30.8	---	69.2	---	100.0	---	---	---
SUBBASINS	03-05-02		03-05-01 03-05-03 03-05-04 03-05-05						
8-Digit Hydraulic Units	03030001		03020106						

* = Watershed areas defined by the 8-Digit Hydraulic Units do not necessarily coincide with subbasin titles used by DWQ.
Source: USDA, Soil Conservation Service - 1982 and 1997 NRI
Note: Cape Fear River subbasin 03-06-24 is included in the hydrologic unit 03030001 in the White Oak River Basin Plan.
Neuse River subbasin 03-04-14 is included in hydrologic unit 03020106 in the White Oak River Basin Plan.
These hydrologic units are discussed in the White Oak River Basinwide Water Quality Plan.

9.2.2 Changes in Wetland Acreages

An assessment of changes in wetlands within the White Oak River Basin was completed in 2006 using historical data and North Carolina Coastal Region Evaluation of Wetland Significance (NC CREWS) wetland maps and DWQ permitted wetland mitigation data.

<u>Historical Extent of Wetlands in the White Oak River Basin</u>

Based on analysis of the extent of hydric soils in the basin, there were about 458,297 acres of wetlands in the basin at European settlement, which was about 53 percent of the land in Carteret and Onslow Counties (SCS 1978 and 1992). Table 47 shows the approximate original extent of major wetland types in the basin. The most common wetland type probably was wet flat made up of a mixture of pine flats, hardwood flats and pine savannas.

Table 47 Historical Wetland Types and Acreage in the White Oak River Basin

Wetland Types	Acreage	Percent
Salt Marsh/ Estuarine shrub and fringe forest	59,030	13%
Bottomland Hardwood and Riverine Swamp Forest	28,383	6%
Pocosin	93,315	20%
Depressional Swamp Forest	22,499	5%
Wet Flat	255,070	56%
Totals	**458,297**	**100%**

Present Extent of Wetlands in the White Oak River Basin

An analysis of the present extent of wetlands in the White Oak River basin is limited by the amount and age of the available data. Table 48 shows acres of wetlands by major type in the White Oak River basin in the mid-1990's based on the NC CREWS data (Sutter, 1999). The most common wetland type was managed pine (26 percent of wetlands), pocosin (18 percent), pine flat (16 percent), and riverine swamp forest (eight percent). Salt/brackish marsh made up about 18 percent of the wetlands in the basin. Compared to the original extent of wetlands in the basin, about 18 percent of the wetlands have been converted to non-wetland uses (primarily by agricultural and urban land uses) with an additional 22 percent converted to managed pine. Therefore, about 60 percent of the original wetlands in the basin are still present in a mostly unaltered condition.

Table 48 Present Wetland Types and Acreage in the White Oak River Basin

Wetland Type		Cleared	Cutover	Drained	Normal	Total acres
Estuarine	Salt/Brackish Marsh	0	0	6,742	61,894	68,636
	Estuarine Shrub/Scrub	94	249	337	8,780	9,460
	Estuarine Forest	0	0	0	242	242
	Maritime Forest (wet)	1	47	0	146	194
Riparian	Bottomland Hardwood Forest	184	538	781	9,038	10,541
	Riverine Swamp Forest	1	1	1,034	28,870	29,906
	Hardwood Flat	90	601	1,544	9,752	11,987
	Headwater Swamp	57	1,138	282	5,635	7,112
	Freshwater Marsh	0	0	355	883	1,238
Non-riparian	Pine Flat	551	4,390	10,567	56,436	71,944
	Pocosin	54	752	8,393	67,150	76,349
	Depressional Swamp Forest	70	319	1,064	9,468	10,921
	Managed Pine	0	0	0	99,200	99,200
Other	Human Impacted	0	0	0	2,803	2,803
Totals		**1,102**	**8,035**	**31,099**	**360,297**	**400,533**

A total of 388.8 acres of wetlands and 38,403 linear feet of streams were permitted to be filled as recorded in DWQ's Basinwide Information Management System (BIMS). The average annual amount of permitted fill was 35.0 acres of wetlands and 3,491 linear feet of streams from 1996-2006.

Wetland and Stream Restoration in the White Oak River Basin

Over the 11-year period from 1996 to 2006, a total of 1,267.15 acres of wetlands were restored in the White Oak River basin and 7,019 linear feet of streams were restored. A large portion of this restoration (451 acres and 8,600 feet of stream) was done at a large non-compensatory mitigation site in the North River Farms area by the NC Coastal Federation. The NC Ecosystem Enhancement Program also conducted large amounts of mitigation in the watershed, as did several private mitigation efforts for particular projects. The apparent balance, between stream loss and restoration is due to non-compensatory stream mitigation. However, stream mitigation has not replaced stream loss in the White Oak Basin over the past decade. This analysis also shows the White Oak Basin having a net gain of wetland acres when compared to wetland impact over the past decade, however the functionality of the restored wetlands remains unknown.

Recommendations from the Wetlands Assessment Report are listed below.

1) Determination of wetland status and trends – Given the present state of GIS-based wetland data, a clear picture of wetland status and trends in the White Oak basin is not possible. An urgent need exists to update the NC CREWS dataset and then provide GIS-based data every decade for the basin. These data should be segregated into major wetland types so trends can be discerned within these types.
2) BIMS improvements – DWQ's BIMS database needs to be modified to allow data analyses on a Basinwide level rather than just a countywide level. BIMS will also need to be modified to track wetland and stream functional assessments.
3) Compliance improvements – DWQ's compliance inspections are inadequate due to staffing shortages. A new EPA Implementation Grant will assist in improving the compliance inspection program, but this effort must also be sustained in order to be effective.
4) Stream mitigation – It is clear that stream mitigation has not replaced stream loss in the White Oak Basin over the past decade. The Army Corps of Engineers and DWQ should consider requiring more stream mitigation to adequately compensate for these losses. This is especially true since non-compensatory stream mitigation is the main reason for the apparent balance of impact versus mitigation, since 2002.
5) Wetland mitigation – From this analysis, it appears that the White Oak Basin has had a net gain of wetland acres when compared to wetland impact over the past decade. This hard-gained momentum must be sustained into the future in order to offset past wetland impacts in the basin.
6) Functional assessment of wetlands and streams – It is clear from this analysis that the acres of wetland losses have been more than offset by acres of wetland gains. It is less clear whether the wetland functions have also been replaced. In the near future, wetland permitting agencies will begin to institute a statewide wetland functional assessment method.
7) Documenting the benefits of mitigation – The hydrology, water quality and habitat benefits of wetland and stream mitigation need to be more vigorously documented. Since *in situ* monitoring is so expensive efforts should be made to develop predictive models based on real field data to accurately predict the value to mitigation to the basin.

9.3 Managing the Impacts of Growth, Development and Stormwater Runoff

9.3.1 Assessment of Current Conditions

The DWQ, in its goals to assure that all waters of the state meet or exceed their designated uses began an assessment of the adequacy of the current North Carolina rules intended to protect shellfish waters. DWQ further intended to determine if there was a way to enhance the level of protection provided to these waters if the current rules were deemed to be inadequately protecting this vital resource in North Carolina. Critical to this review was an assessment of the adequacy of North Carolina's stormwater rules. Existing rules are further discussed in Chapter 8.

North Carolina's current stormwater regulatory programs for coastal areas were adopted in the late 1980's as three primary coastal programs, the Coastal (State) Stormwater Program, Shellfishing (Class SA) Waters Program, and the Outstanding Resource Waters (ORW) Program. Each of these programs require engineered stormwater control structures for high-density areas, but no engineered stormwater controls were required for low-density projects.

High density is defined as more than 24 percent built-upon area or more than two dwelling units per acre. Recent reviews of scientific literature show that stream degradation and impairment occurs to varying degrees when 10-15 percent impervious cover is established without structural stormwater controls result in water quality degradation.

In North Carolina, over 1,255 acres of Class SA, ORW waters have been closed to commercial shellfishing due to elevated levels of bacteria since 1990. The Division of Environmental Health Shellfish Sanitation Program notes that stormwater runoff is the primary cause of bacterial contamination in more than 90 percent of the shellfish areas sampled. In light of the increased acreage of areas closed to shellfish harvesting, DWQ embarked on a study of the current conditions and impacts to the state's shellfish waters. DWQ found that between 1988 and 2005, 73 percent of new impervious surfaces in coastal areas were constructed under low density provisions (<24 percent impervious surfaces) that do not require engineered stormwater control measures, but instead rely on practices such as swales for water quality protection. The use of swales for low density areas indicate only a 25 percent effectiveness rate in reducing bacterial contaminants and may actually contribute to bacterial loading by providing a conduit to increase runoff volumes and rates. In contrast, engineered stormwater control structures for high density areas include wet ponds and wetlands with 70 and 78 percent bacteriological removal rates respectively.

Stormwater runoff carries sediment particles from drainage ditches, streambanks, parking lots, and construction sites. These sediments bind to other pollutants, such as bacteria and viruses. Binding to soil particles protects the bacteria from ultraviolet rays that can kill the organisms. Bacteria coated sediment accumulates in coastal shallow water bottoms, which can be easily agitated, allowing the sediments to go in and out of suspension. Under favorable conditions, fecal coliform bacteria can survive in bottom sediments for an extended period (Howell et al., 1996; Sherer et al., 1992; Schillinger and Gannon, 1985). Therefore, concentrations of bacteria measured in the water column can reflect both recent inputs as well as the resuspension of older inputs. In addition to the bacteria and pollutants, the sediment itself threatens the oyster beds by smothering them.

DWQ assessed recent data and information on acres of shellfish closures in six tidal creeks in New Hanover County in the neighboring Neuse River basin (Mallin, 2006). This research focused on a county whose population grew 25 percent between 1990 and 2000, and is expected to increase an additional 31 percent by 2020. This research found a strong correlation between bacteria levels and impervious surfaces in the watershed; the greater the amount of impervious surfaces, the greater the bacteria levels. This correlation has also been documented by other research in South Carolina's coastal tidal creeks (Holland et al., 2004). In addition, there is a strong association between turbidity and fecal coliform bacteria levels in these estuarine waters.

Poorly designed and maintained septic systems contribute to bacteria problems. Bacteria conveyance research further notes that septic tanks in porous soils can readily pass through the soil and can enter coastal water within hours (Paul et al., 2000). Sandy soils and high water tables appear to be unsuitable for septic systems, yet these systems are relied on heavily in eastern North Carolina for waste management. Fecal bacteria counts have also been found to be higher upon outgoing tides and during wetter years due to subsurface movement through saturated soils and increased stormwater runoff. Ditching and draining appear to facilitate the flow of septic waste to surface waters.

DWQ's assessment of research results show that the acreages of shellfish waters closed (approximately 4, 446 acres) to shellfishing has increased significantly between 1988 and 2005, and there have been new closures after the implementation of the current stormwater programs. North Carolina waters permanently closed to shellfishing have increased by approximately 19 percent since 1984. The reliance on no engineered stormwater controls for low density projects is the major identifiable shortfall in the current programs. Without changes to these programs, there will be continued degradation of shellfishing waters.

9.3.2 Assessment of Future Conditions

With this knowledge, DWQ will proceed to determine how shellfishing waters can be better protected from stormwater runoff and its associated spectrum of pollutants. It will be critical to adopt programs that require control structures to be used for development activities in an effort to better control and treat stormwater runoff. To this effect, DWQ will be assessing options for lowering or removing the low density option waiver from engineered stormwater controls. Two new programs may provide these options.

The Phase II stormwater rule is one of these options. These rules meet the federal Phase II requirements and are contained in Session Law 2006-246. These new rules will commence in July 2007 and are in part intended to redefine low density to 12 percent and areas within ½ mile of "shellfish resource waters". In addition, there are more stringent stormwater design controls defined for high density projects (see Chapter 8 for more information).

The second option is the Universal Stormwater Management Program (USMP) developed by DWQ. This is a voluntary program that may be adopted by local government discretion. It is hoped that the USMP will become effective in early 2007. This program does not allow for a low-density waiver (see Chapter 8 for more information).

The goal of these and other stormwater control programs and mechanisms is to point to the fact that new construction activities do not have to degrade water resources if controls and treatment of stormwater are put into place.

Planning for sustainable growth in the White Oak Basin requires awareness, understanding and implementation of sound design and management options. The coastal environment and natural resources contribute to our quality of life while supporting and promoting economic growth. Communities should anticipate growth while incorporating Low Impact Development technologies in their planning to promote long-term sustainability of our natural resources. The NC Division of Coastal Management with NC Sea Grant and NCSU College of Design developed ***The Soundfront Series***, informational guides to assist property owners and community planners and managers. The guides are available in print and on the web. http://www.ncseagrant.org/.