Chapter 8: **Community Support**

Often the general public is not well informed about historic tidal modifications and their associated ecological impacts. Consequently, vast areas of tidally restricted aquatic and estuarine habitat remain degraded despite the potential to be restored to productive estuaries. Developing public awareness of the need for restoration and gaining public support for projects are challenges that require the development of community relations programs. Governmental and non-governmental organizations, including environmental non-profit groups, must adopt strategies that nurture the development of an informed and politically active constituency in order to realize the widespread restoration of tidal areas.

Building organizational capacity and dedicated staff in the areas of education, advocacy, and volunteer coordination may be the most important investments toward the restoration of healthy estuaries in the Southeast U.S. This section provides:

- Recommendations for developing long-term community support;
- Information about establishing and maintaining a volunteer base;
- Resources for building community support; and
- Community support highlight project: Clam Bayou Tidal Hydrology Restoration Project, Sanibel Island, Florida.

Additional community support resources and summary recommendations can be found in the ***Toolkit*** (page 212).

A local class participated in data collection activities at the Little River Marsh Project in New Hampshire.

Photo Credit: UNH

Building Programmatic Support for Restoration

Ensuring that all the resource groups understand and appreciate the significance of productive coastal estuaries and the urgency for a long-term coastal restoration strategy is important (Steyer 2000). Organizations adopting a long-term, programmatic approach to restoring tidal hydrology on a regional scale must employ multiple public involvement strategies. Some of these strategies include:

- *Securing political involvement.* Adequate resources and the appropriate policy mechanisms needed to address restoration opportunities at a meaningful scale can often only be generated through public interaction with legislative bodies. Support at the legislative level can result in direct comprehensive funding of sustained programs rather than the piecing together of smaller efforts and initiatives. These political activities are often undertaken by environmental nonprofit organizations.

For a list of related environmental nonprofit organizations, see the ***Toolkit*** *(page 213).*

- *Marketing completed projects.* Utilize media during construction and volunteer events to provide visibility of project activities. After the project is complete, well-maintained interpretive signs at accessible locations can educate the public in perpetuity. Producing videos to air on local cable channels can provide a cost-effective means for reaching large audiences to demonstrate project benefits.
- *Hosting public tours and celebrations.* Invite the public to participate in planned site tours hosted through all phases of project implementation. Consider having a project dedication celebration that includes partners, dignitaries, and members of the public.
- *Engaging the public in hands-on activities.* See the ***Volunteers and Monitoring*** section below (page 74).

Volunteers prepare to plant red mangroves at the Clam Bayou Tidal Hydrology Restoration Project in Sanibel Island, FL. This project was initiated by local citizens interested in reversing the negative impacts caused by restricted tidal flow.

Photo Credit: NOAA

Building Project-Level Support

When developing plans for tidal hydrology restoration projects, it is important to account for concerns of the affected community. Neighborhoods, government agencies, private consultants, and industry must all participate in planning, implementation, and evaluation of the restoration as equals. Otherwise, the local community is not likely to develop a sense of ownership (Cassagrande 1997). Projects that may be technically sound risk never getting off the ground if the project team ignores or overlooks public perceptions and needs. When a project team addresses community concerns and the project receives widespread support, expedited planning, permitting, and project implementation can result.

The project team should develop a thorough strategy regarding how and when to engage the public in the project planning process, depending on project aspects such as landownership, the project scope, and the proximity of the project to populated areas. Typical community concerns often focus on the expected construction timeline and footprint, as well as on new tidal flooding patterns—especially projections about potential flooding during extreme weather events.

For more on identifying appropriate sites and project feasibility considerations, see

Chapter 2: Project Identification, Feasibility and Planning

Chapter 4: Project Design

While each tidal hydrology restoration project will present unique community outreach challenges, ***Table 8a*** (next page) outlines some basic aspects of a public involvement strategy to consider.

Community Support

Table 8a. Strategies for successful public support.

Strategy	Guidance
Engage early	Communicate early with the community to help gain approval from landowners directly affected by or adjacent to the project area. Having affected stakeholders serve as project proponents can help build public support.
Hold public meetings	Provide the public an opportunity to weigh in on the project idea long before plans have been finalized. It is also helpful to make field trips to restored ecosystems, so that community members can envision a finished product in their neighborhood (Casagrande 1997).
Clearly translate project goals and objectives	Avoid complex science jargon during public meetings and when developing outreach materials. Use non-scientific language, well-versed speakers, graphics, and charts to avoid confusion and educate your audience. Modeling activities can be especially challenging to describe. Remember that the ecological benefits of restoring tidal flow are not necessarily obvious to the general public.
Incorporate community interests	Understand community interests related to the characteristics and history of the project location. On occasion, restoration projects can be designed to meet primary ecological goals while simultaneously satisfying community goals with limited additional expense. For instance, aesthetic benefits realized from a project may provide increases in adjacent property values.
Utilize success stories	Enable community understanding of the project. Utilize simple schematics and visualizations of similar projects during meetings, in outreach materials, and when working with the media.
Address misinformation	Use the media to disseminate correct information that directly addresses community concerns if misinformation is widespread.
Reexamine the project	Reexamine the project if substantial and valid community opposition exists. Incorporate community concerns into subsequent plans, or if opposition is insurmountable, accept that the project may not be viable.

Volunteers provided needed manpower to remove invasive plant species at the Eden Landing Salt Pond Project in California.

Photo Credit: NOAA

Developing Volunteer Strategies

Developing and implementing a comprehensive volunteer strategy is a key step toward effectively building public support. The inclusion of volunteers for a one-time task may be a simple undertaking, but investing resources in a sustained community involvement strategy to implement education, outreach, advocacy, and volunteer coordination can provide an exponential increase in project benefits. The ultimate goal of such a volunteer and involvement program is to educate and inspire citizens to take ownership of their public resources and to serve as a voice for future restoration and protection actions and policies.

Some specific benefits of an effective volunteer strategy include:

- *Financial benefits.* At the project level, volunteers can be very useful for reducing costs while helping meet matching funds requirements for grants. Some granting programs accept a standard value for volunteer contributions. In 2009, volunteer service was valued at $20.85 per hour.

For up-to-date valuations, visit http://www.independentsector.org/programs/research/volunteer_time.html

CONSIDER

Utilizing the Professional Capacity of Volunteers

Investigate the skill sets of available volunteers. Biologists, engineers, heavy equipment owners/operators, teachers, graphic designers, and grant administrators can provide particularly valuable volunteer services. Individuals living in proximity to a project site may have professional backgrounds that can assist with complicated aspects of project implementation.

For example, the management of the Sandpiper Pond Tidal Hydrology Restoration Project in South Carolina was enhanced by the expertise of a local retired environmental administrator. The resident led recruitment and coordination of partners and volunteers, secured grants, and completed project reports. The grant matching funds associated with these complex tasks were commensurate with the value of the service provided, rather than a standard volunteer hourly rate based on manual labor.

For more, see the **Sandpiper Pond Tidal Hydrology Restoration Project Portfolio** *(page 146).*

- *Project maintenance.* Engaging volunteers in tidal restoration project construction and maintenance may inspire them to continue in a long-term stewardship role.

- *Expanded capacity.* Dedicated volunteers sometimes take on more complex roles, including recruitment and management of new volunteers, as well as initiation and management of their own projects.

- *Stronger grant proposals.* Grant proposals with volunteer, education, and outreach components are typically ranked higher by funding agencies during the review process than similar projects that omit these components.

- *Public exposure.* Volunteer events often gain the attention of media outlets and local politicians.

Volunteer coordination is a well-documented practice featured in several guidance manuals. A list of these resources is provided in the ***Toolkit***, page 213. Despite the benefits of volunteers, it is important to consider the cost and time required to train volunteers, the need for oversight, and the potential liability if volunteers are injured (IWWR 2003). There are also many dangerous and complex elements of tidal hydrology restoration, such as heavy equipment operation and technical design components, that can not be readily undertaken by volunteers.

Investing resources into developing a volunteer monitoring program can provide numerous benefits to restoration organizations and their projects.

Photo Credit: Dave Burdick

Volunteers and Monitoring

One resourceful way to engage volunteers is to involve them in long-term scientific monitoring activities. This can provide multiple benefits, as monitoring is usually a requirement associated with the use of grant funds and is necessary to gauge project outcomes. Often the burden of monitoring can be decreased by utilizing volunteers who live close to the project.

Using volunteers for frequent monitoring also allows for more rapid response to potential project performance issues, such as tidal blockages from organic debris or sedimentation, invasive vegetation, vandalism, or illegal dumping. High-frequency scientific monitoring is typically not financially feasible; however, an "adopt a wetland" style program, in which volunteers assist with scientific monitoring, encourages both long-term volunteer involvement and ensures consistent qualitative assessment.

Members of the public, academics, and state or federal resource managers sometimes question the validity of monitoring data gathered by volunteers. However, volunteer monitoring data is often as accurate and valid as the data gathered by academics and professionals (Fore et al. 2001; Canfield et al. 2002; Ringvall et al. 2005). The key to ensuring data quality is to provide thorough training for volunteers in standard monitoring protocols.

Some points to consider when developing a volunteer monitoring program:

- *Volunteering capabilities.* Acknowledge the skill set of your volunteers. Limit volunteer involvement with complicated techniques such as vegetation monitoring or fish counts. Consider tasks associated with bird, mammal, and other megafauna monitoring.

- *School programs.* Involve local schools in monitoring programs. Schools are helpful in amassing long-term data sets over multiple years. When compiling this data, be sure to check quality and discard outlier data points.

- *Academic oversight.* Involve university researchers in the development of monitoring plans and provide these researchers with the best data collection volunteers. Dr. David Burdick, with the University of New Hampshire, implemented a monitoring plan incorporating volunteer data collection for the Little River Marsh Restoration Project. He found that their contribution has been beneficial for long-term repeated measures.

For more information, see the **Little River Marsh Restoration Project Portfolio** *(page 158).*

Below are some monitoring activities critical for evaluating effectiveness of tidal hydrology restoration projects that may more easily apply to volunteers.

- *Invasive vegetation.* Consider training volunteers to identify one or two types of specific invasive plants. Provide them with the appropriate tools to document the species' presence or absence and removal, if applicable. It is generally advisable not to assign volunteers activities requiring percent cover estimates, since the results require calibration and may create problems with data analysis.

- *Hydrology.* By establishing permanent stations at the project site, certain tools, such as a staff gauge, allow for data collection on tidal height and period, requiring only periodic visual observation and recording of information.

- *Salinity.* Simple tools (e.g., refractometer and data sheets) allow for the collection of many relevant data points.

- *Water quality.* Many companies sell inexpensive water quality kits that are very simple to use in the field with straightforward training techniques and instruction manuals. Typical water quality kits test for dissolved oxygen, salinity, pH, and more.

- *Bird counts and identification.* Bird lovers enjoy watching, identifying, and counting birds.

- *Photopoint.* Visual markers such as numbered wooden posts can be established throughout the project site. Volunteers can then use a compass for orientation, a camera, and a data sheet indicating the direction to take photos from any given post. It is also useful to provide an example photo taken from each photopoint to allow for a refinement of orientation. While typically qualitative in nature, a photo can often provide more information than quantitative data points.

For more information on volunteers and monitoring, see **Chapter 7: Scientific Evaluation and Monitoring.**

Staff gauges are easily used by volunteers to determine tidal height.

Photo Credit: NOAA (Steve Block)

PROJECT HIGHLIGHT

Clam Bayou Tidal Hydrology Restoration Project

Sanibel Island, Lee County, FL

During the South Florida population boom of the 1950s and 1960s, local developers used dredge and fill construction activities to create vehicular causeways connecting Sanibel and Captiva Islands to the mainland. Unfortunately, these causeways bisected Clam and Dinkins Bayous, halting all natural tidal flushing between the two mangrove-dominated systems. The impoundment of freshwater resulted in the loss of more than 150 acres of mangroves, 20 acres of oyster reefs, and 120 acres of seagrass beds. Fish kills and algae blooms were also common occurrences following causeway construction.

Private landowners surrounding the bayous formed the Clam Bayou Preservation Association to investigate the problems and identify solutions for the system. The Association used private funds to hire a consultant to study the flow and bathymetry at the site. The Association also prompted the City of Sanibel into action with the results of this study and partnered with the city to obtain the remaining information needed to develop a project design.

The city took the lead in 2006 with the installation of three 10x10-foot box culverts under the causeway. Citizens have remained actively engaged, planting more than 5,000 mangroves over the course of multiple volunteer days to help repopulate mangrove islands within the Bayou. Rob Loflin, City of Sanibel project manager, acknowledges that local citizens "drove and sped up" the process.

For more information, see the **Clam Bayou Tidal Hydrology Restoration Project Portfolio** *(page 128).*

Citizen volunteers planted over 5,000 mangroves following installation of the box culverts at the Clam Bayou Tidal Hydrology Project in South Florida.

Photo Credit: NOAA

GLOSSARY

Active restoration design strategy

Construction activities across a large area relative to the overall size of the area to be restored (as compared to passive design strategies) and/or characterized by regular and scheduled long-term maintenance. *Examples include the installment, maintenance, and operation of a water control structure, tidal creek creation, or other major land alterations.*

Adaptive management

A management approach that involves monitoring the outcomes of a project or issue and, on the basis of the monitoring, improving the way the project is managed.

As-built assessment

Measurement and assessment of the actual constructed or installed project design components immediately following final construction activities; describes physical and/or functional characteristics in comparison to the final design.

Bathymetry

Measurement of depths of water in oceans, seas, and lakes; also the information derived from such measurements.

Benthic

Pertaining to the bottom (bed) of a water body.

Construction footprint

The actual area or boundary of physical construction activities; the actual project area affected by construction activities may be much larger than the "construction footprint."

Culvert

A conduit used to allow passage of water below ground level. *Often a large diameter metal, concrete, or polyvinyl chloride (PVC) pipe used to allow water to pass underneath a road, railway, or embankment, for example.*

Ecosystem

A conceptual unit comprising organisms interacting with each other and their environment. An ecosystem has the major attributes of structure, function, complexity, interaction and interdependency, temporal change, and no inherent definition of spatial dimension.

Estuary

Regions of interaction between rivers and nearshore ocean waters, where tidal action and river flow create a mixing of fresh water and saltwater. These areas may include bays, mouths of rivers, salt marshes, and lagoons.

Field protocols

A formal plan describing the standardized procedures and techniques to be used in conducting construction activities.

Floodplain

Typically flat land areas adjacent to a river, stream, lake, estuary, or other water body that is subject to flooding. This area, if left undisturbed, acts to store excess floodwater. The 100-year floodplain, or lands that have a 1 percent chance of flooding in any given year, are typically regulated for protection by federal, state, and municipal agencies.

Flow velocity

Distance traveled by a packet of fluid in a unit of time. *Influences the options for project design, specifically in regard to appropriate sizes for breaches, culverts, etc.*

Geographic Information System (GIS)

A data management tool that provides users with a spatial understanding of locations or events based on georeferenced data. *GIS is often used to locate specific features on a landscape or analyze relationships between features. Successfully implemented, GIS aids goal setting, data analysis, and monitoring ecosystem integrity.*

Global Positioning System (GPS)

A system based on satellites that allows a user with a receiver to determine precise coordinates for their location on the Earth's surface. These are a primary source of spatial data used in GIS systems.

Hydric soil

Soils that remain saturated year round.

Hydrology

Study of water and its properties, including its distribution, movement, and quality.

Hydrologic model

Simplified, conceptual representations of part of the hydrologic cycle; primarily used for hydrologic prediction and for understanding hydrologic processes. *Allows for analysis of current site hydrology and prediction of potential impacts from alternative restoration project designs.*

Impoundment

A body of water confined by a dam, dike, floodgate, or other barrier used to exclude or control the influence of water flow.

Invasive species

A species that does not naturally occur in a specific area and whose introduction is likely to cause economic or environmental harm.

Land cover

The physical material at the surface of the Earth. Land covers include grass, asphalt, trees, bare ground, water, etc. *There are two primary methods for capturing information on land cover: field survey and thorough analysis of remotely sensed imagery.*

Land use

The manner in which a parcel of land is used or occupied.

Lagoon

A shallow body of water that usually has a shallow restricted inlet from the sea; typically characterized by low salinity (less than 10 parts per million) and containing less than one-third seawater.

Levee

A large dike or embankment built to prevent inundation, often having an access road along the top, which is designed as part of a system to protect land from floods.

Mosaic habitat

Multiple microhabitat types patched together potentially providing for a range of ecosystem services and allowing for on-site habitat migration as a hedge against sea level rise. *For example, incorporation of freshwater, upland, high marsh, and transition zones might allow the site to be more adaptable to changing conditions.*

Nekton

Organisms that swim freely in the ocean.

Passive design strategy

One-time construction activity resulting in a self-sustaining system with little long-term intervention; typically characterized by a relatively small area of construction activity that reintroduces or enhances tidal flow, allowing a larger area to restore naturally over time. *For example, the small footprint of construction through removal and replacement of a section of causeway that enhances a large area of seagrass with no hands-on restoration work in the seagrass habitat.*

Reference sites

An "ideal" undisturbed or relatively undisturbed healthy habitat that has characteristics similar to a potential restoration project. *Reference sites can help practitioners understand hydrology modification impacts on many ecological indicators, including water quality (salinity, dissolved oxygen content, or pH), vegetation, and nekton community composition. Comparisons to reference sites can also help define desired ecosystem services, and provide targets for post-restoration monitoring. Reference sites provide information about the natural range of values for the parameters used in the monitoring program and show the annual variation in these parameters.*

Restoration (Habitat)

Process of re-establishing a self-sustaining habitat that closely resembles a natural condition in terms of structure and function. Does not focus on a single species, but rather strives to replicate the original natural ecosystem to support numerous species.

Returning the tide

Restoring or enhancing flow of tidal waters to estuarine habitats in areas that have been historically degraded as a result of tidal barriers such as levees, dikes, causeways, and failed or undersized culverts. Barriers are breached or removed to provide a more natural tidal regime with the ultimate goal of restoring estuarine habitat functionality.

Salinity regime

The prevailing pattern or normal set of conditions for salinity in an ecosystem. *Salinity strongly influences distribution of plant and animal communities as well as soil characteristics. Understanding the current salinity regime will aid in developing appropriate targets for post-restoration salinity regimes. Soil or interstitial salinities should also be investigated for proper plant selections.*

Sheet flow

A thin layer of water movement over the land surface with no identifiable channels.

Tidal footprint

The expanse of area influenced by the tidal ebb and flow. *Important for any engineering or hydrology modeling effort used to forecast the effects of hydrology modification at the site.*

Tidal hydrology restoration

Re-establishing or enhancing movement, distribution, and quality of waters in an estuarine environment with the purpose of re-establishing habitat that closely resembles a natural condition in terms of structure and function.

Tidal prism

Range in volume of water from high to low tide.

Tidal regime

The prevailing pattern or normal set of conditions of the tides.

Topography

The physical features of the land.

Turbidity barrier

A device used to contain and control the dispersion of sediments and siltation in association with nearshore or in-water construction activities. *Examples include turbidity curtains, silt curtains, and silt barriers.*

Wetlands

Permanently or intermittently wet areas, shallow water, and land water margins that support a natural ecosystem of plants and animals that are adapted to wet conditions. *Examples of wetlands include freshwater and saltwater estuaries, fens, bogs and swamps, tidal marshes, prairie potholes, seagrass beds, mangroves, and forested wetlands. Cowardin et al. (1978) provides an in-depth discussion of wetland definition and classification.*

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