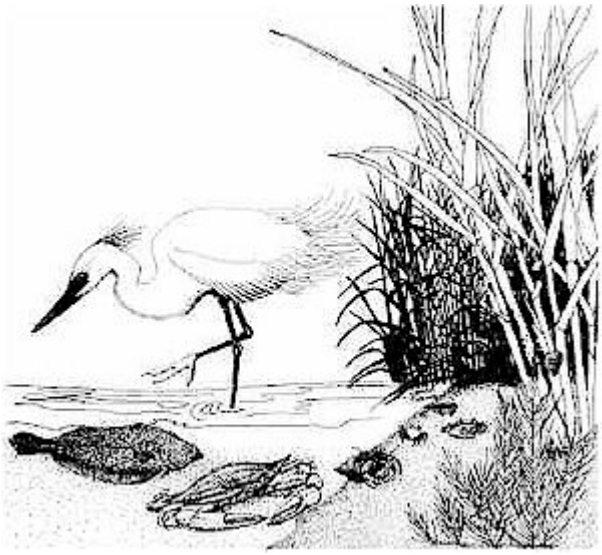
GREATER CHARLOTTE HARBOR WATERSHED GUIDE

An Educational Guide
for
Ecological Explorations
within the
Charlotte Harbor National Estuary Program Study Area



Prepared by the
Charlotte Harbor Environmental Center

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Red Mangrove (*Rhizophora mangle*)

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is funded by the

Charlotte Harbor National Estuary Program
Working to protect estuaries and watersheds from Venice to Estero Bay to Winter Haven
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FOREWORD

The overall goal of the ***Greater Charlotte Harbor Watershed Guide is*** to inform and educate citizens and visitors to the southwest Florida area through active participation in ecology related explorations, activities and field trips. Habitat and wildlife areas mentioned in this guide are all located within the Charlotte Harbor National Estuary Program (CHNEP) study area. Use of this guide should foster understanding of the environmental issues of the watershed, particularly CHNEP priority problems of Fish & Wildlife Habitat Loss, Water Quality Degradation, and Nutrient Enrichment.

Appreciating the importance of public land acquisition to protect and maintain quality of life; realizing the importance of mangrove and seagrass habitats; enhancing awareness of water quality issues, particularly conservation and pollution; and encouraging recognition and removal of exotic vegetation are objectives of this guide. Implementing activities from this guide should promote general public deliberation and awareness to the actions individuals and communities can undertake to conserve, preserve, sustain and enhance natural communities.

CHARLOTTE HARBOR
National Estuary Program

"Public deliberation in the political environment does what the wetlands and salt marshes do in the natural environment. At first glance, they seem unattractive and unimportant. But they are where life begins." **- David Mathew**

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"Educate, educate, educate. Keep talking, keep explaining…Show the wonderful beauty and promise of the natural world." - **E. O. Wilson**

SECTION I

OUTDOOR EXPLORATIONS

"*The health and well-being of both humans and wildlife are dependent upon the quality of the natural environment.*"
– **Project Wild**

EXPLORATION 1: ESTUARY

OBJECTIVES: Participants will review the following concepts:

definition of **watershed *** and **estuary ****

importance of these ecosystems to clean water, flood control, species diversity, healthy environment and economic resources;

recognize threats to rivers, wetlands and estuaries from habitat loss, pollution, stormwater, siltation and trash;

discuss how natural systems consist of communities of plants, animals and non-living things that are inter-dependent and ever-changing.

*** watershed: geographic area in which water, sediments and dissolved minerals all drain into a common body of water or bay (e.g. Charlotte Harbor)**

A watershed includes all plants, animals and non-living components like rocks and soil. Everything we do can affect the surface and ground water that runs through this system.

MATERIALS: *The Mudflat* guide or field guide, pencils, dip nets, plankton net, Buckets, large plastic container, viewers, microscope, chart, refractometer (salinity indicator)**,** educational materials, posters

PROCEDURE:

1. Welcome, introduce leaders & participants.
2. Define & describe the Charlotte Harbor National Estuary study area: rivers and **estuaries** (**where fresh and salt water meet ****).
3. Review the natural community (algae, sea grass, mangroves, animal organisms) using survey booklets.
4. Distribute nets, buckets & demonstrate wading technique. (All participants are required to wear shoes in the water.)
5. Participants wade and dip net. Small buckets are emptied into large container for observation & discussion.
6. Use plankton net to collect sample for microscope viewing.
7. Use field guides to identify and classify organisms while discussing food web and habitat. LIVE RELEASE ALL!
8. Explain & take turns doing salinity tests (35 ppt = salt water).
9. Discuss habitat loss, human impact, pollution & stormwater run-off.
10. Summarize and distribute hand out materials.

LOCATIONS: Ponce De Leon Park, Punta Gorda; Cedar Point Park, Englewood; Indian Mound & Lemon Bay Parks, Sarasota County; Lover's Key State Park, Estero; J.N. "Ding" Darling National Wildlife Refuge, Sanibel Island

"Estuaries are wonderful places for catching and examining drifting and swimming organisms that move in and out on the two pulsating flows of water." - **Gerald Durrel**

EXPLORATION 2: MANGROVES

OBJECTIVES: Participants will review the following concepts:

mangroves are tropical trees that grow in intertidal salty environments and can tolerate flooding;

mangrove trunks and roots prevent shoreline erosion, produce food and provide shelter for marine organisms as well as nesting sites for birds;

recognize importance of mangroves to estuarine habitat and water quality through filtration;

identify mangrove protection efforts through the *1996 Mangrove Trimming and Preservation Act* www.dep.state.fl.us/water/wetlands/mangroves/mangrove.htm.

MATERIALS: binoculars, hand lens, field guides

PROCEDURE:

1. Welcome to mangrove habitat. Introduce leaders & participants.
2. Define & describe characteristics of mangroves.
3. Point out red mangroves (*mother* trees) produce seedling tree from top branches. Identify seed (looks like a chili pepper) and propagule (seedling tree). After seedling falls, it grows roots in 4 – 6 hours if it is implanted. During high tide the propagule floats horizontally, soaks up sun, produces food and grows for up to a year in the water; then floats vertically and plants itself in sandy shallows. Prop roots hold sediment making these trees ***land builders***.
4. Highlight black mangroves. Locate pneumatophores (breathing roots).
5. Distinguish salt excluder (red mangrove) from salt extruder like the black (see salt residue on back of leaves).
6. Locate white mangroves (usually furthest from shoreline) with salt extruding nodules on either side of the leaf stem.
7. Use field guides to identify and classify organisms: algae, fungi, lichens, insects, crustaceans (such as fiddler and mangrove crabs), oysters, tree snails and birds while discussing food web and mangrove habitat.
8. Discuss habitat loss and regulations, human impact, erosion, filtration.
9. Summarize and distribute hand out materials.

LOCATIONS: Spanish Point, Osprey; Cedar Point Environmental Park, Indian Mound & Lemon Bay Parks, Englewood; Ponce De Leon Park & Alligator Creek Preserve, Punta Gorda; Four Mile Cove Ecological Preserve, Cape Coral; Lighthouse Beach & "Ding" Darling National Wildlife Refuge, Sanibel Island; Lover's Key State Park, Estero

"Mangroves are Florida's true natives and are part of our state heritage. It is up to us to ensure a place for them in Florida's future as one of our most valuable coastal resources." **- Florida Marine Research Institute**

EXPLORATION 3: PINE FLATWOODS

OBJECTIVES: Participants will review the following concepts**:**
definition of **hydric pine flatwoods ***, ecosystem, food web, biodiversity;
several key animals that make their homes in flatwoods and adjacent habitats;
importance of native plants to wildlife in Florida;
identification of exotic plants and why they are harmful to the ecosystem;
value of land preservation and management as vital to wildlife survival;
recognize impact of habitat destruction on wildlife populations.

***hydric pine flatwoods: common Florida habitat dominated by longleaf pines and/or slash pines and low-growing saw palmetto.**

Fire and flood are natural forces shaping southwest Florida's flatwoods**.** Wildlife that utilizes wetlands and hammocks also relies on flatwoods. Flatwoods can contain 50 to 75 species of plants per acre.

MATERIALS: backpack, binoculars, clipboard, plant & animal ID list, field guides

PROCEDURES:

1. Welcome, facilitate introductions and orientation to site.
2. Pass out equipment; give brief instructions for use.
3. Review appropriate trail behavior.
4. Hike trails: ID native & exotic plants and animals, evidence of fire.
5. Discuss wildlife needs provided by pine and palmetto flatwoods.
6. Compare effects of habitat loss.
7. Answer questions and summarize the exploration for the group.
8. Distribute take-home materials.

LOCATIONS: CHEC's Alligator Creek site, Punta Gorda & Cedar Point, Englewood;
RV Griffin Reserve & Deep Creek (longleaf pine), DeSoto County;
Cape Haze Aquatic Buffer Preserve on Highway 771, Charlotte County;
Caya Costa State Park & Caloosahatchee Regional Park, Lee County,
Myakka River State Park, Sarasota; Oscar Sherer State Park, Osprey;
Myakka State Forest, North Port

"May you always walk the earth in love and beauty."
- Joseph Cornell

EXPLORATION 4: WETLANDS

OBJECTIVES: Participants will review the following concepts:

definition of **wetlands ***

importance of wetlands to overall health of the watershed through natural stormwater filtration and flood control;

identify wetlands as *ecotones*, transition zones from upland to deep water aquatic systems;

recognize habitat provided by wetlands for plants, fish and wildlife.

*** Wetlands are areas along shoreline or upland that are daily or seasonally flooded or soaked by fresh or salt water for a significant part of the year. Wetland habitats (fresh and salt) are defined by characteristic plant species**.

MATERIALS: binoculars, field guides, journals

PROCEDURE:

1. Welcome all to the cypress swamp, a forested fresh-water wetland system.
2. Define and describe characteristics of deciduous bald cypress trees.
3. Discuss plant adaptation to environment while observing buttressed base.
4. Ask participants why they think the tree produces conical *knees*.
5. Identify red maple, dahoon holly, wax myrtle, ferns, epiphytes (Spanish moss, wild pine, orchids), spatterdock, alligator flag as wetland species.
6. Look and listen for evidence (scat or calls) of pileated woodpecker, osprey, anhinga, limpkin, river otter, raccoon, alligator, snakes, turtles, frogs, fish.
7. Stop. Be still and record impressions in journal.
8. Summarize and discuss: wetland habitats crucial for many endangered species.

LOCATIONS: Six Mile Cypress Boardwalk, Lee County; Cypress Boardwalk at Highlands Hammock State Park, Highlands County; Telegraph Swamp Boardwalk at Babcock Wilderness Adventure, Charlotte County

"Because of the many benefits – environmental, economic and aesthetic – that wetlands provide, they rank among our most important natural resources."
- DEP *Homeowners Guide to Wetlands*

EXPLORATION 5: RIVERS

OBJECTIVES: Participants will review the following concepts**:**
identify boating safety rules;
reason for shallow water (sea grass & manatee) slow zones;
importance of clean water to all living populations; ways to keep it clean;
how Florida residents make a living related to rivers and estuaries.

MATERIALS: 2 or 3 dip nets and small buckets, Coast Guard approved pontoon boat, kayaks or canoes, binoculars (several pairs), field guides**,** Secchi disc, refractometer, stop watch, water testing kits (pH, oxygen, phosphate), thermometer (F), plankton net w/collection tube, plankton ID booklet, plankton slide strip & viewer, crab trap, large bucket & heavy gloves, hand-out materials

PROCEDURES:

1. Gather and preload equipment and materials.
2. Welcome participants aboard & facilitate introductions.
3. Brief orientation to boat & safe boating instructions.
4. Begin river journey.
5. Define estuary, describing Charlotte Harbor Estuary along with adjacent rivers and wetlands. Stress economic, esthetic, wildlife habitat values.
6. Point out channel markers for safe harbor navigation.
7. Distribute binoculars & share Florida water bird guide.
8. Interpret encounters with birds (resident and migratory) and wildlife along river.
9. Identify native plant growth along shoreline.
10. Describe negative impact of exotic species (shoreline & aquatic).
11. Introduce importance of healthy water in estuary through water quality monitoring tests.
12. Demonstrate use of secchi disc to test clarity, discuss results and record.
13. Collect river water in a bucket.
14. Discuss reason for dark brown color (tannic acid leached from roots of trees).
15. Test & record water temperature.
16. Demonstrate salinity using sea test meter (hygrometer) and/or refractometer while explaining salt wedge. Record results.
17. Demonstrate pH, dissolved oxygen and total phosphate tests. Guide participant testing.

"*The care of rivers is not a question of rivers, but of the human heart.*"
- Tanaka Shozo

EXPLORATION 5: RIVERS (CONTINUED)

PROCEDURES (continued):

18. Discuss & record results.
19. Check previously placed crab trap. ID catch-of-the-day.
20. Discuss regulatory laws and point out individual markings on floats.
21. Live-release (heavy gloves for adult blue crab).
22. Drag plankton net to collect sample for viewing in sample tube.
23. Define plankton and discuss importance in marine food chain.
24. Circulate plankton sample (demonstrating use of binoculars in reverse to magnify), plankton guides & viewers.
25. Collect all equipment.
26. Summarize data, reaffirming impact of development, storm water run-off and pointless personal pollution.
27. Highlight importance of waterway clean-ups.

LOCATIONS: Myakka River & tributaries;
Peace River & tributaries:
Harbour Heights Park (access to Hunter Creek also), Charlotte County; Riverside Ramp in Cleveland, Deep Creek Ramp in Fort Ogden, Lettuce Lake Ramp in DeSoto County, Shell Creek from Hathaway Park & Prairie Creek, Washington Loop Road, Charlotte County;
Tidal Caloosahatchee River & tributaries (west of Franklin Lock):
Caloosahatchee Regional Park, Orange River from Manatee Park canoe & kayak launch, Lee County; W.P. Franklin Lock Recreation Area, Alva

"Rivers are the ribbons that tie us to the spirit of the land."
- Jeff Rennicke

EXPLORATION 6: LAKES

OBJECTIVES: Participants will review the following concepts:

definition of **eutrophication***

recognize that many natural Florida lakes are solution lakes formed when groundwater dissolved subsurface limestone which collapsed, leaving a depression to fill with water from rivers, runoff or underground sources;

identify other lakes as relic sea bottom depressions formed during earlier geologic periods;

discuss rise and fall of lake levels in response to dynamics of water cycle.

*** Eutrophication is the natural aging of a lake, characterized by increasing nutrient concentrations and sedimentation rates. Cultural eutrophication (human created) can accelerate the process by altering shoreline vegetation, discharging, and depleting ground water sources through overuse. (http://lakewatch.ifas.ufl.edu/)**

MATERIALS: water monitoring kit, Secchi disc, thermometer, bucket

PROCEDURES:

1. Meet group at a natural lake site. Introduce participants and lake concepts.
2. Survey shoreline vegetation.
3. Check clarity of water for light filtration with Secchi disc.
4. Check and record temperature which regulates amount of dissolved gases.
5. Check and record dissolved oxygen (DO). Minimum 5 ppm for fish.
6. Monitor for nitrogen and phosphorus as related to plant growth.
7. Discuss photosynthesis, decomposition, sedimentation and nutrients.
8. Summarize water quality problems and solutions.

LOCATIONS: Lake Ariana, Auburndale; Lake Placid**,** Lake June in Winter Scrub State Park - Highlands County**;** Lake Parker, Lakeland; Teneroc Fish Management area

"Lakes are more than standing bodies of water.
Their physical and chemical characteristics make them ideal homes for an immense variety of plants and animals."
- H. Lee Edmiston & Vernon B. Meyers

EXPLORATION 7: SCRUB

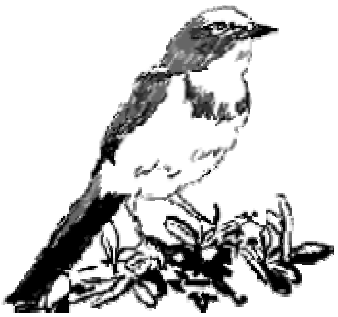
OBJECTIVES: Participants will review the following concepts:
soils found in scrub habitats are sandy and lack nutrients;
discuss how scrub habitats were naturally maintained by severe lightening fires that burned all to the ground every 10 to 40 years;
recognize that some of Florida's rarest plants and animals live only in scrubs;
appreciate benefits of water recharge to underground aquifers from scrub areas.

MATERIALS: binoculars, hand lens, field guide

PROCEDURE:

1. Introduce participants to scrub habitat (home to 25 known species of rare, threatened or endangered plants, along with 20 listed animals).
2. Look closely at sandy trails as group hikes, watching for evidence of life: (S-shaped trails left by sand skinks, gopher tortoise burrows, funnel-shaped burrow entrances of the funnel wolf spiders, tracks from white-tail deer, wild hog, black bear, squirrel, bobcat, spotted skunk or Florida mouse).
3. Identify invasive exotic species that threaten scrub habitat: feral hogs, rosary pea, cogon grass, air potato.
4. Watch for threatened scrub jays and explain family of helpers phenomenon.
5. Point out characteristic lichen covering ground and trees, rosemary, scrub mint, lupine and oak.
6. Discuss important role of fire for maintaining plant diversity, stimulating seed germination and flowering.
7. Summarize, fostering an appreciation for this ancient habitat.

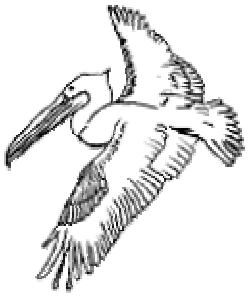
LOCATIONS: Oscar Sherer State Park, Osprey; Archbold Biological Station, Lake Placid; Tippecanoe Scrub, Amberjack & East Port Conservation Area, Charlotte County; Lake Manatee State Recreation area



"*In scrub – as in all natural communities – land, plants and animals are inseparably linked. Without wildlands there is no hope for wildlife*."
- Eric Lovestrand

SECTION II

INVESTIGATIVE ACTIVITIES



"*Everything in wild nature fits into us, as if truly part and parent of us. The sun shines not on us, but in us. The river flows not past, but through us, thrilling, tingling, vibrating every fiber and cell of the substance of our bodies, making them glide and sing."* – **John Muir**

ACTIVITY 1: TRASH BUSTING

OBJECTIVES: Participants will review the following concepts:

recognize the primary sources of litter: mishandling of household trash, illegal dumping, trucks with unsecured loads, smokers, motorists and pedestrians;
discuss that local, state and federal governments spend millions of tax dollars annually to remove litter caused by carelessness and illegal acts;
identify marine debris as originating from land or water, through recreational or commercial release, by intention or accident;
value of pollution prevention efforts within the Charlotte Harbor National Estuary Program's study area.

MATERIALS: water, sunscreen, hat, insect repellent, closed-toe shoes, camera, gloves orange or bright colored vests or T-shirts, trash bags, data cards

PROCEDURES:

1. Plan and prepare clean-up time, location and announcements.
2. Welcome volunteers and introduce method and reasoning for data collection.
3. Highlight safety: stay well away from traffic if road cleaning, report large drums or five-gallon buckets to proper authorities, be careful of sharp objects, do not lift heavy items without help.
4. Avoid trampling sensitive plant areas; watch for wildlife; get help if you encounter stranded, entangled or injured animals.
5. Clean up all litter and debris within your assigned area.
6. Do not collect natural items: shells, driftwood, algae and sea grasses.
7. Record pertinent data: items listed on card, estimated weight, number of bags.
8. Suggest participants take a litter bag for individual pick up when exploring natural areas.
9. Thank all!

LOCAL CLEAN-UPS: Coastal Clean-up, third Saturday of September; Keep America Beautiful, held in spring through county groups; Adopt-A-Road clean-ups, sponsored by community & neighborhood organizations and held 4 X per year.

"*In the conservation movement, active participation by a committed public is essential. Without a determined wave of supporters to press for change, marine species and ecosystems at risk cannot be protected.*"
Center for Marine Conservation

ACTIVITY 2: REMOVING EXOTICS

OBJECTIVES: Participants will review the following concepts:

Florida Exotic Pest Plant Council's www.fleppc.org invasive, exotic species;
need to remove all plant material from boats & trailers when leaving a waterway;
identify reasons for removing invasive exotic plants: spread rapidly, no natural predators or competing species, reduce biodiversity, degrade natural areas and associated wildlife habitat, increase fire risk due to thick vegetation, impede flood control and block navigation;
recognize serious infestation problems caused by release of invasive aquatic and terrestrial species from aquariums and ornamental potted plants.

MATERIALS: *Florida Exotic Pest Plant Council's* list, sturdy shoes, long pants, long-sleeved shirt, gloves, goggles, appropriate herbicide, clippers, loppers

PROCEDURES:

1. Plan and prepare exotic removal work party, location and announcements.
2. Welcome volunteers, introduce method and reason for removal.
3. Identify assemblage of exotics and distinguish from similar natives.
4. Highlight safety: wear protective clothing, use tools correctly, work with a partner, read label carefully before using herbicide (the label is the law).
5. Cut and pull vines, hand pull small plants and seedlings, dig up clumps of shoreline exotics (like wild taro), making sure to remove entire root.
6. Pile debris for disposal or burn.
7. Treat stumps and re-sprouts with appropriate herbicide (see Bibliography for *Identifying & Controlling Invasive Exotic Plants in Southwest Florida*).
8. Caution participants to wash well if herbicide was handled. Wash work clothes separately.
9. Thank all!

LOCAL WORK PARTIES: Audubon Society (local chapters), CHEC, Florida Department of Environmental Protection's *Estero Bay Buddies* & *Friends of the Charlotte Harbor Aquatic Buffer Preserve*, The Nature Conservancy - Lake Wales *Ridge Rangers*, Four Mile Cove Ecological Preserve - City of Cape Coral

"Control of exotic plants in Florida's natural areas and waterways is expensive, costing taxpayers millions of dollars each year. By getting involved in preventing the introduction and spread of invasive exotic plants, you will be saving yourself money." **- Florida Exotic Pest Plant Council**

ACTIVITY 3: TRACKING

OBJECTIVES: Participants will review the following concepts:

recognize that tracking was an important survival skill for our ancestors;
discuss how tracking can be used as a species monitoring tool;
identify how tracking can enhance connection and appreciation for wildlife and sustaining habitats;
efforts in the Charlotte Harbor NEP study area to collect and record wildlife data.

MATERIALS: samples of galls, scat, owl pellets, bird's nest, snakeskin shed, chewed leaves, animal bones, guide to tracks, data sheets and/or wildlife journal

PROCEDURE:

1. Pre-select a hiking route with a variety of animal signs and habitats.
2. Introduce participants, tracking activity to search for presence of animals and what can be learned. (Scientists use animal signs as data for wildlife population studies).
3. Lead group to follow trails, find tracks and signs. Encourage group to step around tracks and not disturb animal evidence.
4. Observe stride (length between prints) and straddle (width).
5. Identify the animal and habitat, noting time of day and weather conditions.
6. Record on data sheet and/or draw tracks in wildlife journal.
7. Notice scat & contents. Bones and hair indicate carnivore, like bobcat. Berries or grass are eaten by herbivores or omnivores, like gopher tortoise or raccoon.
8. Look for incised vegetation from rabbits or rodents or broken twig ends from deer feeding.
9. Search for resting places, depressions in grass, dens, burrows and nests.
10. Hair, fur, skin sheds and feathers are clear animal signs to observe.
11. Rubs and territory markings with scent indicate animal activity.
12. Listen for sounds, songs, calls, rustling footsteps in the brush, water splashing.

"By being more aware of animals and their activities within the environment, humans can become appreciative to the land and develop concern for its well-being." **- Sara Quick**

ACTIVITY 4: RECYCLE TO PRESERVE

OBJECTIVES: Participants will review the following concepts:

recognize recycling saves landfill space, prevents contamination of groundwater; recycling makes economic sense and saves energy;

each person in Florida produces 7 pounds of solid waste per day, an average office worker generates 120 – 150 pounds of recyclable paper per year;

recycling even one (1) can saves enough energy to run a computer for three hours;

appreciate efforts to recycle monofilament fishing line to prevent entangling wildlife – manatee, turtles, dolphins, fish and seabirds – as well as threat to divers and entangling propellers.

MATERIALS: containers & signs for recycled materials

PROCEDURE:

1. Set up a waste reduction program at home, office, school, and workplace.
2. Evaluate how much waste (paper, plastic, and glass, metal) is created daily.
3. Make simple changes to everyday processes: keep waste from being generated in the first place, bring cloth bags for shopping, use scrap material, reuse.
4. Place recycle bins (including one for monofilament) in convenient place for all to use.
5. Encourage participants to rinse articles before placing them in recycle containers.
6. Mark clearly for separation of items.
7. Return items for reuse: plastic flower pots to local nurseries, toner cartridges to local dealers, scrap metal to vendors.
8. Research local pick-ups, community recycle stations, fund raising recycle projects (scouts & Lion's Club) and recycling vendors (newspaper).
9. Deliver all recyclables to appropriate stations.

"We've got to do it right, create local markets, make recycling a natural part of the economy so it becomes a part of our lifestyle."
– David Dougherty of Clean Washington

ACTIVITY 5: NATIVE GARDENS & COMPOSTING

OBJECTIVES: Participants will review the following concepts:
growing native plants in your garden saves time, energy and money;
native plant gardening conserves water, reduces runoff, decreases pollution, provides habitat needs for wildlife, looks beautiful;
value of composting to recycle yard waste, as well as fruit and vegetable scraps and to return nutrients to the soil;
recognize water conservation efforts achieved by utilizing a cistern or rain barrel.

MATERIALS: garden tools, wheel barrow, gloves, newspaper, compost bin, barrel for cistern, native plants, mulch

PROCEDURE:

1. Promote native plant gardening through programs and demonstration areas (e.g. Lemon Bay Park, CHEC's gardens at Alligator Creek & Cedar Point).
2. Cover grass with newspaper, then mulch to prepare beds.
3. Keep established native plants, remove invasive exotics and add appropriate plants (to particular soil and habitat) from local native nurseries.
4. Design and maintain a yard that thrives predominantly on rainfall once plants are established.
5. Use a rain gauge to track rainfall to avoid unnecessary watering, especially during dry season.
6. Compost for natural soil enrichment. No need to fertilize.
7. Mulch regularly to prevent erosion, keep soil moist, discourage weed growth.
8. Install a cistern to collect water for irrigation during dry season.
9. Control pests naturally by attracting beneficial wildlife (insects, bats, birds, lizards, frogs, toads) and using biodegradable soap solutions.
10. Use porous material (bricks, paving stones or rocks) for garden walkways.

"Study landscape in nature more, and gardens and catalogues less, is our advice to the rising generation of planters who wish to embellish their places in the best and purest taste." **– The Horticulturist, 1851**

ACTIVITY 6: WATER QUALITY MONITORING

OBJECTIVES: Participants will review the following concepts:

chemistry of a water body varies based on dissolved and suspended materials from land use, soils, geology and precipitation;

regular investigation, testing and measurement reveal important data concerning the health of the watershed;

recognize that test results will fluctuate with time of day and water temperature;

value of volunteer water quality monitoring for data collection across the Charlotte Harbor NEP study area (e.g. Charlotte Harbor Estuaries Volunteer Water Quality Monitoring Network managed by FDEP Aquatic Preserve).

MATERIALS: dissolved oxygen (DO), nitrate, phosphate, ammonia concentration test kits, secchi disc, refractometer, gloves, safety glasses

PROCEDURE:

1. Emphasize safety information: keep kits away from heat, read instructions; know first aid in the event of a mishap; sample in well-ventilated area; open one reagent at a time; do not mix chemicals, except as instructed; wear goggles while analyzing sample; avoid contact with skin, nose, eyes and mouth; keep water available for flushing; wash hands after testing.
2. Discuss each test while demonstrating and explain reason for monitoring: **DO** - reduced levels from bacteria (fertilizer, sewage effluent, stormwater runoff produce excessive algae growth which is decomposed by oxygen demanding bacteria) & temperature (cool water holds more oxygen than warm); **nitrate** - excess (from car exhaust, fertilizer, ammonia production of bacteria converting to nitrate) promotes algae growth; **phosphate** – excess (from fertilizer, pesticide, industry and cleaning products) causes plankton bloom that consumes oxygen; **ammonia** – generated naturally by bacterial degradation of biological molecules in nitrogen cycle; high levels indicate sewage pollution and bacterial contamination.
3. Test each sample by following test kit instructions. Repeat each test three times and take average. Record data accurately.
4. Rinse and dry equipment. Dispose of chemicals properly. Report results to appropriate agency.

"We tend to take fresh water for granted, but we do so at our peril. We are utterly dependant on water for our lives. We all use it, and increasingly, we all pollute it. So water is not just their responsibility, whoever they are. It is our responsibility. We are all water managers.

- Malcolm Hollick

ACTIVITY 7: SPECIES MONITORING

OBJECTIVES: Participants will review the following concepts:

volunteers can make an important contribution to nature conservation through species monitoring projects across the Charlotte Harbor National Estuary study area;

discuss how frogs, panther, coyotes, black bear, eagles, scrub jays, sandhill and whooping cranes, burrowing owls, sea turtles, bats, horseshoe crabs, striped skunk, manatee, birds, plants and fish are being monitored through government agencies, Audubon and non-profit nature organizations;

recognize how survey data on invasive and native species helps direct management and restoration of habitats by providing reliable information on status and trends of biota, identifying species at risk, revealing possible factors causing observed trends and providing tools for forecasting future trends based on adaptive management decisions.

MATERIALS: binoculars, thermometer, watch, clipboard, pencil, data forms, map or GPS, hat, raingear, first aid kit, cell phone.

PROCEDURES:

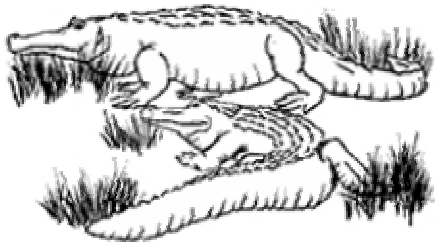
1. Introduce participants and review map of monitoring area.
2. Emphasize safety: work with a partner, wear sturdy shoes, be aware of weather conditions.
3. Establish route, monitoring sites and protocol.
4. Begin observation: settle at first site; record time, place on map (or GPS coordinates), & general weather condition.
5. Look, listen, smell and record for established time period. Record end time.
6. Repeat at all assigned stations. Submit total report to group leader.

PROGRAMS: Frog Watch, *Southwest Florida Amphibian Monitoring Network*; Audubon - *Christmas Bird Count, Great Backyard Bird Count & Feeder Watch*; Florida Fish and Wildlife Conservation Commission - *horseshoe crab and striped skunk studies* as well as *black bear, eagle, panther, burrowing owl, deer, turkey, alligator and coyote monitoring*; Florida Scrub-Jay Citizen Monitoring Network, Florida Marine Research Institute – *Red Tide, Asian Green Mussels, Seagrass, Fisheries, Marine Mammal & Marine Turtle monitoring.*

"Successful volunteer monitoring programs demonstrate that volunteers can collect valuable data. These programs encourage schools, community groups, individuals, naturalists, backyard enthusiasts, Scouts and Guides to engage in monitoring." **– Nature Watch**

SECTION III

EDUCATIONAL FIELD TRIPS



"Environmental citizens know where they fit into Florida's environment. They know how to behave in ways that do not harm the environment, or that make it better. Environmental citizens have the idea that they are a part of the environment that is all around us."

- Florida Department of Environmental Protection

FIELD TRIP 1: FLORIDA HOUSE & CHASE SOLAR HOME

OBJECTIVES: Participants will review the following concepts:

Florida House Learning Center in Sarasota demonstrates appropriate design strategies and technology for living in southwest Florida;

water conservation measures modeled throughout the house and landscape include indoor and outside cisterns, grey water reuse, micro-irrigation, low-water-use fixtures and equipment;

both Florida House and the Chase's solar home in DeSoto County demonstrate energy efficiency through passive solar design, materials and construction methods, lighting design and fixtures, equipment and solar energy utilization.

MATERIALS: lunch, water, writing materials (notebook, pen or pencil), camera

PROCEDURE:

1. Select date, time and maximum number of participants for field trip event.
2. Contact - Florida House Learning Center at 941-316-1200 or flhouse@scgov.net for reservations and information and/or Chase Solar House, Arcadia at 863-993-0391 or gjchase@chasepower.net.
3. Determine transportation options and cost: car pool, van rental, bus.
4. Write press release and contact media to announce field trip.
5. Create and distribute fliers throughout the area.
6. Receive registration names and numbers through phone or email responses.
7. Sign-in station at meeting site before boarding vans, bus or assigned cars.
8. Meet, as pre-arranged, in parking lot of facility.
9. Tour the house with knowledgeable guide.
10. Summarize, discuss concepts learned and distribute pertinent materials.
11. Return to site.

LOCATIONS: Florida House Learning Center and/or **Chase Solar Home,** Arcadia
4600 Beneva Road South
Sarasota, Florida 34233

"We are resolved that our impact on the natural environment must not jeopardize the prospects of future generations."
- Sustainable City Program

FIELD TRIP 2: KAYAK VOYAGE OF DISCOVERY

OBJECTIVES: Participants will review the following concepts:
kayaking in aquatic preserves, river, creeks and along shorelines provides an eco-friendly way to navigate a boat through shallows without scarring sea grass beds;
wildlife need space, so please show respect and keep your distance;
recognize that waterways need to remain clean, so carry out trash.

MATERIALS: kayak (own or rent), paddle, paddle float, life jacket, water, litter bag, shoes, hat and sunglasses with straps, bilge pump, camera, and/or binoculars (waterproof or in sealed case), snack

PROCEDURES:

1. Plan your proposed route. Use two nautical miles per hour as a comfortable cruising speed. Allow time to explore.
2. Check weather, surf and tide conditions. Consider wind direction and currents. You might have to schedule around a tidal change.
3. Leave a trip plan with a land-based friend.
4. Wear a life jacket, hat that protects ears and neck, sunscreen, long sleeves.
5. Launch at safe access ramp, park, riverbank or beach.
6. Practice proper paddling technique (beginner lesson or how-to book).
7. Watch shallow areas during low tide for oyster bars and/or seagrass beds.
8. Respect wildlife (Society for Ethical ECO-Tourism in Southwest Florida www.seeswfla.org).

LOCATIONS: Koreshan State Historic Site & Estero River Outfitters, Estero; Lovers Key State Park, Fort Myers Beach; Oscar Sherer State Park, Osprey; Grande Tours, Placida; Canoe Outpost-Peace River and Canoe Safari, Arcadia; Peace River Canoes, Wauchula; Gulf Coast Kayaks, Matlacha; Tarpon Bay Explorers, Sanibel; Cape Outfitters, Cape Coral

"To understand, you have to listen and watch. That is part of what kayaking in South Florida is all about; discovering what has been there all along."
- Adventure Times Kayaks

FIELD TRIP 3: ANCIENT INDIAN MOUNDS

OBJECTIVES: Participants will review the following concepts:

ancient Calusa people are considered important by researchers because the Calusa achieved a remarkable level of complexity while being sustained by the southwest Florida estuarine environment;

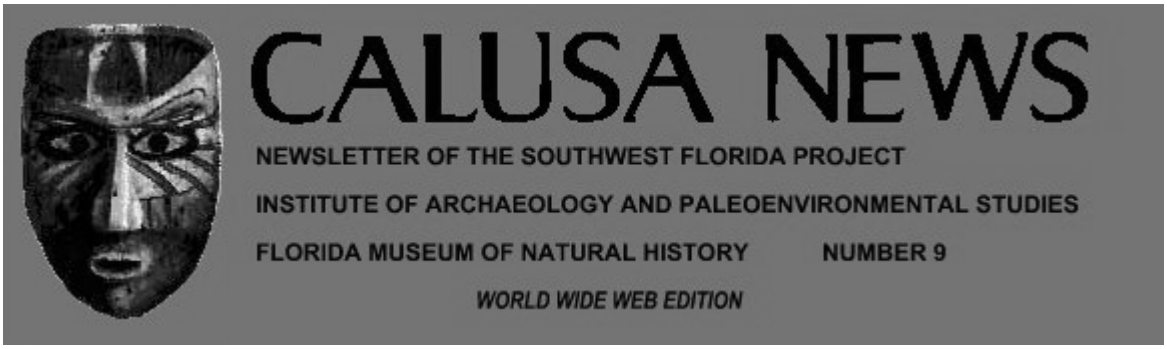
significant mounds bear testimony to the Calusa lifestyle and provide natural and cultural value for the people of Florida;

recognize that cultural resources are protected and should remain undisturbed.

MATERIALS: lunch, water, camera, binoculars, insect repellent, sunscreen, hat

PROCEDURES:

1. Follow procedures from **Field Trip 1** for planning and implementing trip.
2. Contact Randell Research Center on Pineland for tour (239-283-2062 or e-mail johneworth@comcast.net) or plan kayak tour to Mound Key from Lovers Key State Park. **LOCATIONS** provide still more opportunities.
3. Visit culturally significant sites which were utilized by Calusa (most powerful ancient society in southwest Florida).
4. Learn facts and conjecture about the population of southwest Florida natives - 20,000 strong with a military force, nobles and commoners.
5. Understand that the Calusa left no written record, so anthropologists relied on journals from Jesuit and Franciscan missionaries.
6. Summarize, discuss concepts learned and distribute pertinent materials.



LOCATIONS: Historic Spanish Point, Osprey; Indian Mound Park, Englewood; Mound House, Fort Myers Beach; Mound Key Archaeological State Park, Estero Bay; Randell Research Center, Pineland; Acline Mound, Charlotte Harbor State Buffer Preserve or Charlotte Harbor Environmental Center

"For thousands of years, people have lived in the upper Charlotte Harbor area, near the mouths of the Myakka and Peace rivers. Today…The area's archaeological heritage is endangered and needs to be appreciated and protected." **- George M. Luer**

FIELD TRIP 4: LANDFILL TOUR

OBJECTIVES: Participants will review the following concepts:

landfill management operations deal with hundreds of tons of solid waste daily; full, completed areas are covered with dirt and sod for reclamation;

recognize that leachate, liquid created by the decomposition of the refuse and the percolation of rainwater through the waste material, drains through a solid waste landfill absorbing dissolved and suspended solids and materials;

examine deep well injection process for leachate;

appreciate that in order to conserve landfill space, Lee, Hendry and Polk Counties use an integrated approach to solid waste management, waste minimization and waste-to-energy combustion.

MATERIALS: comfortable clothing and shoes, drinking water

PROCEDURE:

1. Follow procedures from **Field Trip 1** for planning and implementing trip.
2. Contact local county landfills (waste management) for reservations and information. **Find contact number in government pages of phone book**.
3. Tour landfill facility with knowledgeable guide.
4. Observe that a vertical bentonite (clay soil) slurry wall, blending with the natural confining layer of soil surrounding the landfill below ground, contains the leachate; which drains to a collection system; is pumped to a biophysical treatment facility, through a sand filter and injected into 3000 foot deep wells in a confined saltwater aquifer.
5. Notice extra environmental safeguards include detection meters between the liners which are monitored continuously and monitoring wells around the site which are sampled quarterly to test the groundwater quality.
6. Summarize, discuss concepts learned and distribute pertinent materials.

LOCATIONS: Glades County Solid Landfill No. 2, Hendry County Pioneer Landfill, Charlotte County (Zemel Road) Municipal Solid Waste Management Facility, Highlands County SW Management Center; Lee County: Solid Waste Management or Gulf Coast SLF – Waste Management Inc. of Florida, Lee County Waste-To-Energy Facility;

Polk County: Cedar Trail Class III Landfill – Republic Services of Florida LP, City of Bartow Trash Landfill, Pembroke Fort Meade and Pembroke North - Waste Corporation of Central Florida, Inc., North Central SLF (waste to energy combustion site), Northeast SLF & Southeast SLF – Polk County Board of County Commissioners; Sarasota County Solid Waste Department

"The significant problems of today cannot be solved with the level of thinking at which we were when we created them in the first place."
– Albert Einstein

FIELD TRIP 5: WATER PLANT TOUR

OBJECTIVES: Participants will review the following concepts:

"It is the policy of the state that the citizens of Florida shall be assured of the availability of safe drinking water." Section 403.851, Florida Statutes

identify procedures that municipal water plants use to purify water;

recognize that aquifer storage and recovery (ASR) is innovative technology that creates an underground reservoir;

whether water is scarce or abundant depends not only upon available supplies, but also upon patterns of water use and demand;

appreciate that water conservation is an integral part of preserving the resource.

MATERIALS: comfortable clothing and shoes

PROCEDURE:

1. Follow procedures from **Field Trip 1** for planning and implementing trip.
2. Witness fresh water treatment processes:
   A. Aeration – allows gasses to escape and adds oxygen to the water;
   B. Coagulation – aluminum sulfate added to chemically join suspended solids together into *floc* so they can be removed;
   C. Sedimentation – *floc* settles to bottom of clarifying tank by gravity;
   D. Filtration – removes remaining particulate matter;
   E. Stabilization – caustic soda added to adjust pH to non corrosive;
   F. Storage and/or Distribution – delivers water to ASR wells or customer.
3. Compare cost of desalination process (estimated at $5 - $7 per 1000 gallons) to treating fresh water ($.30 - $.50 per 1000 gallons).
4. Learn that reverse osmosis filters dissolved solids by forcing raw water through a series of porous membranes. Concentrated *reject* (brine) water is discharged.
5. Discuss challenges to reverse osmosis process: cost, availability of groundwater sources and regulations restricting brine discharge.

LOCATIONS: Peace River/ Manasota Water Supply Authority, City of Punta Gorda Water Plant, Englewood Water District (Reverse Osmosis), Olga North & Corkscrew South Water Plants - Lee County, City of Sanibel Water Plant

"In southwest Florida most of the water of good quality occurs at the surface in lakes, ponds, streams and canals, and beneath the surface as ground water in the nonartesian and shallow artesian aquifers."

– Durward H. Boggess

FIELD TRIP 6: CITRUS GROVES BMP *

OBJECTIVES: Participants will review the following concepts:
The 1990 Farm Bill defined Sustainable Agriculture as "an integrated system of practices that will satisfy human food and fiber needs; enhance environmental quality and the natural resource base; make the most use of nonrenewable resources and on-farm resources; integrate natural biological cycles and controls; sustain the economic viability of farm operations; enhance the quality of life for farmers, ranchers and society as a whole." *(Title XVI, Subtitle A, Sec. 1603)*

there are 179,093 acres of citrus planting in southwest Florida;
recognize that agriculture accounts for the largest amount of total water withdrawal/use (SWFWMD & SFWMD);
discuss the evolution of wetland protection and mitigation technology utilized by groves under best management practices;
appreciate innovative surface storage and reuse for water conservation.

MATERIALS: comfortable clothing and shoes

PROCEDURE:

1. Follow procedures from **Field Trip 1** for planning and implementing trip.
2. Contact local grove to schedule tour to observe ***** best management practices.
3. Highlight surface water management systems that simultaneously meets the needs of stormwater management for citrus production, partial irrigation supply and wetlands protection.
4. See on-site water retention areas that hold excess stormwater and reduce nutrient runoff.
5. Witness state-of-the-art, low volume, computerized irrigation systems spraying water directly to the root zone; to maximize water conservation and provide for controlled use of fertilizers and other chemicals.
6. Discuss methods of integrated pest management for reduction of pesticides.
7. Learn that modern grove design leaves large tracts of land undeveloped, which provides wildlife habitat as well as a natural buffer between farm lands and urban development. (The University of Florida reported more than 159 native species of wildlife were observed within grove eco-systems.)
8. Learn also that, for every acre of mature citrus trees, 16.7 tons of oxygen are produced yearly from 23.3 tons of carbon dioxide. (University of Florida)

LOCATIONS: Punta Gorda: - Chiquita Gulf Groves, Charlotte County Citrus, TRB Groves; Dyess Groves, Alva; Rainbow Farms, North Fort Myers; Lang Sun Country Groves, Lake Alfred; DeSoto Groves

"With ever growing populations to feed, we must continue to farm efficiently to produce an abundant amount of safe food for everyone."
- Chet Townsend

FIELD TRIP 7: WATER RECLAMATION & EASEMENTS

OBJECTIVES: Participants will review the following concepts:

discuss how local utilities are reusing water for irrigation, rather than injecting all treated wastewater down deep wells;

recognize conservation areas, surrounding facilities, provide habitat for wildlife;

identify that clarified effluent is treated to a standard for public use as reclaimed water (for golf courses, mobile home parks, etc.) or for restricted access reuse on (Charlotte) County's spray irrigation fields;

appreciate state-of-the-art wastewater treatment meets and even exceeds standards established by the Florida Department of Environmental Protection (FDEP) and United States Environmental Protection Agency (EPA).

MATERIALS: local phone book (government pages) for contact numbers

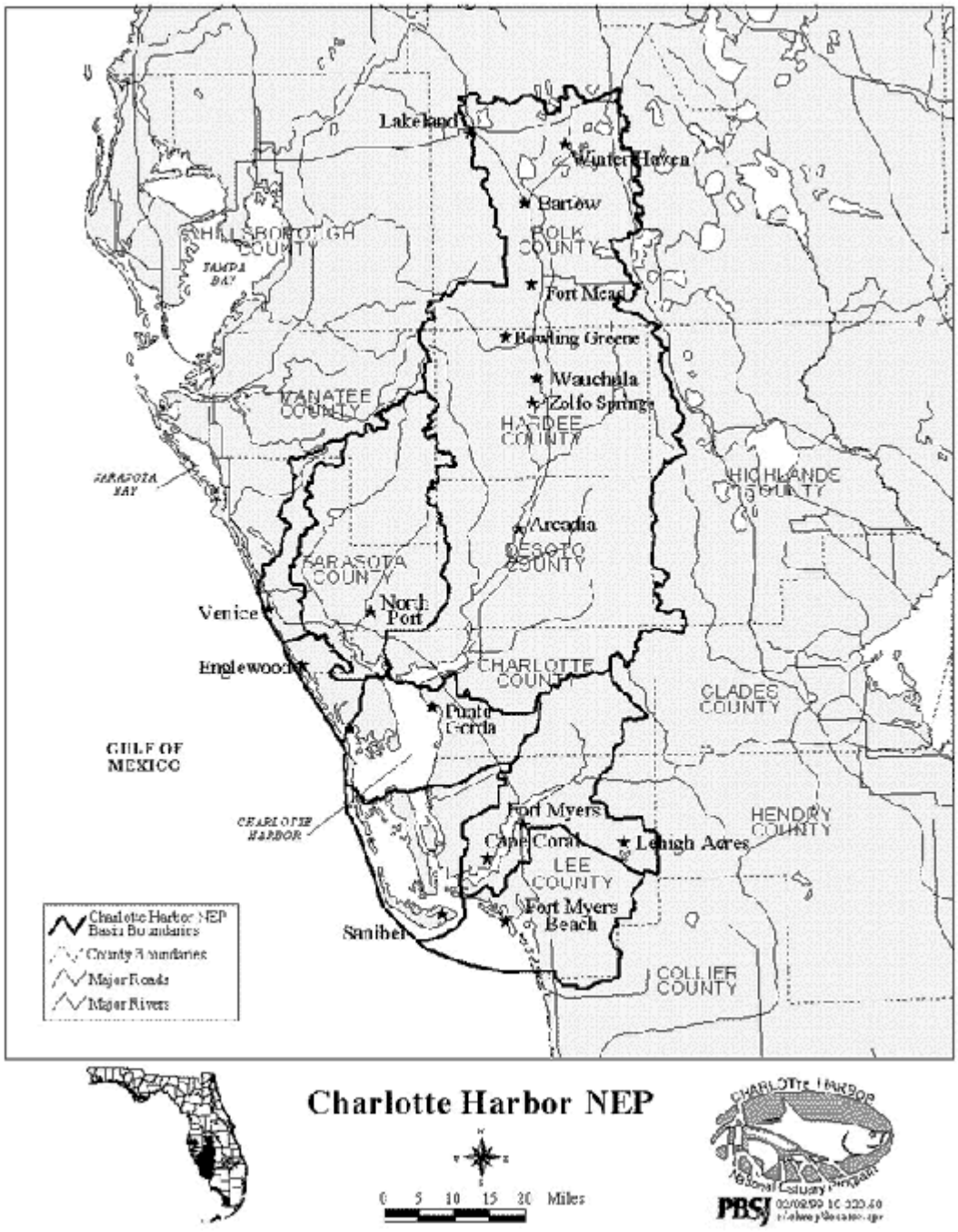
PROCEDURE:

1. Follow procedures from **Field Trip 1** for planning and implementing trip.
2. Contact local wastewater treatment facilities to schedule tour.
3. See that all wastewater flow entering facility is measured and recorded.
4. Explain inflow passing through screens to remove debris (rags and plastic).
5. Point out that a two-step process, at anoxic/aeration basins, removes biochemical oxygen demand and nutrients (pollutants) from wastewater.
6. Note that biosolids (microorganisms) flow to secondary clarifiers to settle out.
7. Finally, a combination of sand filtration and chlorine provides disinfection required for all public distribution of reclaimed water.
9. Visit spray irrigation fields (Effluent from the reservoirs can be sprayed or pumped down deep injection wells).
10. Discuss how biosolid residuals are transported in tanker trucks to approved land site, where they are applied for beneficial reuse. Local governments (DeSoto County) regulate location of disposal with setbacks from waterways.
11. Tour conservation area – home to birds (scrub jays), gopher tortoise, bobcat, cottontails and alligators.
12. Summarize and distribute materials.

LOCATIONS: Cape Coral Utilities: Southwest Water Reclamation Plant; City of Fort Myers Wastewater Facility; Lee County Utilities: Wastewater Facilities, including Pine Island & Fort Myers Beach Wastewater Treatment Plants; City of Punta Gorda Wastewater Facilities; Donax Wastewater Plant, City of Sanibel; East Port Water Reclamation Facility (Charlotte County)

"73% of the Earth's surface is water. Yet, water is a finite resource. … Its value depends on how well it is managed."
- EARTH TECH

MAP



"Conservation is a state of harmony between men and land."
-Aldo Leopold

DIRECTORY

Alligator Creek Preserve
www.checflorida.org
10941 Burnt Store Road - CHEC
Punta Gorda 941/ 575 5435

Amberjack Environmental Park
www.charlottecountyfl.com
Placida 941/ 625 7529

Arcadia Citrus Enterprises
1560 Mathew Drive
Fort Myers 941/ 278 0050

Archbold Biological Station
www.archbold-station.org
Lake Placid 863/ 465 2571

www.audubonofflorida.org

Babcock Wilderness Adventures
www.babcockwilderness.com
8000 State Road 31
Punta Gorda 1-800-500-5583

Caloosahatchee Regional Park
www.lee-county.com
18500 River Road
Alva 239/ 693 2690

Canoe Outpost
www.canoeoutpost.com
2816 NW County Road 661
Arcadia 1-800-268-0083

Canoe Safari
www.canoesafari.com
Arcadia 1-800-262-1119

Cape Outfitters
www.capeoutfittersco.com
1730 Cape Coral Parkway
Cape Coral 239/ 541 2532

Caya Costa State Park *
Boca Grande 941/ 964 0375
Charlotte Harbor Aquatic Buffer Preserve
www.dep.state.fl.us
12301 Burnt Store Road
Punta Gorda 941/ 575 5861

Charlotte Harbor Environmental Center
www.checflorida.org CHEC

Chase Solar Home
www.chasepower.net
Arcadia

Cedar Point Environmental Park
www.checflorida.org
2300 Placida Road - CHEC
Englewood 941/ 475 0769

Chiquita Gulf Citrus
4900 Bermont Road
Punta Gorda 941/ 575 7797

City of Punta Gorda Water Plant
www.ci.punta-gorda.fl.us
941/ 639 2057

City of Sanibel Water Plant
www.ci.sanibel.fl.us
239/ 472-1008

Corkscrew Water Treatment Plant
www.lee-county.com
239/ 479 8534

Deep Creek Preserve
www.swfwmd.state.fl.us
Kings Highway
DeSoto County

Desoto Groves
5577 SW Highway 27
Arcadia 239/ 494 0610,

Dyess Groves
17020 Palm Beach Boulevard
Alva 239/ 728 2121

East Port Conservation Area
www.charlottecountyfl.com
3100 Loveland Boulevard
Port Charlotte 941/ 764 4300

Englewood Water District
201 Selma Avenue
Englewood 941/ 474 3217

Estero Bay State Buffer Preserve
www.dep.state.fl.us
700-1 Fisherman's Wharf
Fort Myers Beach 941/ 463 3240

Estero River Outfitters
www.esteroriveroutfitters.com
20991 South Tamiami Trail
Estero 239/ 992 4050

FFWCC
www.floridaconservation.org

Florida House Learning Center
http://sarasota.extension.ufl.edu
4600 Beneva Road South
Sarasota 941/ 316 1200

Florida Marine Research Institute
www.floridamarine.org

Four Mile Cove Ecological Park
www.capecoral.net
SE 23rd Terrace
Cape Coral 239/ 574 7395

Grande Tours
www.grandetours.com
12575 Placida Rd.
Placida 941/ 697 8825

Gulf Coast Kayak
www.gulfcoastkayak.com
4530 Pine Island Road
Matlacha 239/ 283 1125

Harbour Heights Park
www.charlottecountyfl.com
27420 Voyageur Drive
Harbor Heights 941/ 627 1628

Hathaway Park
www.charlottecountyfl.com
35461 Washington Loop Road
Punta Gorda 941/ 625 7529

Highlands Hammock State Park *
5931 Hammock Road
Sebring 863/ 386 6094

Historic Spanish Point
www.historicspanishpoint.org
337 North Tamiami Trail
Osprey

Indian Mound Park
210 Winson Ave.
Englewood 941/ 474 3065

J.N. "Ding" Darling NWR
dingdarling.fws.gov
Sanibel Island 239/ 472 1100

Koreshan State Historic Site *
P.O. Box 7
Estero 239/ 992 0311

Lake Ariana Municipal Beach
www.polk.wateratlas.usf.edu/
320 Ramsgate Road
Auburndale

Lake June in Winter Scrub State Park *
Daffodil Road
Lake Placid 863/ 386 6094

Lake Parker Park

www.lakelandgov.net
910 East Granada Street
Lakeland 863/ 499 2233

www.lakeplacid-florida.com

Lang Sun Country Groves
Lake Alfred
1- 800-535-1199

Lee County Solid Waste Facility
www.lee-county.com/SolidWaste/

Lemon Bay Park
570 Bay Park Blvd.
Englewood 941/ 474 3065

Lighthouse Beach
Periwinkle Way
Sanibel Island 239/ 472 6477

Lovers Key State Park *
8700 Estero Blvd.
Fort Myers Beach 239/ 463 4588

Manatee Park
www.lee-county.com
10901 State Road 80
Fort Myers 239/ 694 3537

Mound House
www.ecotrail.com
City of Fort Myers Beach

Mound Key Archaeological State Park *
P.O. Box 7
Estero 239/ 992 0311

Myakka River State Forest
www.swfwmd.state.fl.us
North Port

Myakka River State Park *
13207 S.R. 72
Sarasota 941/ 361 6511

The Nature Conservancy
Lake Wales Ridge Program
www.ridgerangers.org
155 Pfundstein Road
Babson Park 863/ 635 7506

Olga Water Treatment Plant
www.lee-county.com
239/ 479 8534

Oscar Sherer State Park *
1843 S. Tamiami Trail
Osprey 941/ 483 5956

Peace River Audubon Society
www.peaceriveraudubon.org
Punta Gorda

Peace River Canoes
2110 Eagle Drive
Wauchula 1-863-773-6370

Peace River/ Manasota Regional Water Supply Authority
www.regionalwater.org
941/ 316 1776

Ponce de Leon Park
4000 West Marion Avenue
Punta Gorda 941/ 575 3324

Rainbow Farms Citrus
6601 Bayshore Road
North Fort Myers 239/ 543 4888

Randell Research Center
www.calusa.us
Waterfront Drive
Pineland 239/ 283 2062

RV Griffin Reserve
www.swfwmd.state.fl.us
Kings Highway
DeSoto County

Six Mile Cypress Slough
www.lee-county.com
7751 Penzance Crossing
Fort Myers 941/ 432 2004

Southwest Florida Amphibian Monitoring
www.frogwatch.net

Tarpon Bay Explorers
www.tarponbayexplorers.com
900 Tarpon Bay Rd.,
Sanibel Island 239/ 472 8900

Tenoroc Fisheries Office
www.floridafisheries.com
3829 Tenoroc Mine Road
Lakeland 863/ 499 2421

Tippecanoe Environmental Park
www.charlottecountyfl.com
Murdock 941/ 625 7529

TRB Groves
Highway 31
Punta Gorda 941/639 0053

W.P. Franklin Lock Recreation Area
www.saj.usace.army.mil/recreation/
1660 South Franklin Lock Road
Alva 239/ 694 2582

* www.floridastateparks.org

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Charlotte Harbor Environmental Center, Inc.
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Florida Lakes
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Wilderness Graphics, Inc
Tallahassee, Florida

Florida's Ancient Islands
The Lake Wales Ridge
FPL, The Nature Conservancy, FDEP, SWFWMD

Florida's Estuaries: A Citizen's Guide to Coastal Living and Conservation
Florida Sea Grant Publications - University of Florida, Gainesville, Florida
SGEB-23

Homeowner's Guide to Wetlands
Florida Department of Environmental Protection

Identifying & Controlling Invasive Exotic Plants in Southwest Florida: A Homeowners' Guide
Charlotte Harbor Environmental Center, Inc.
With funding from the
Florida Department of Environmental Protection
Bureau of Invasive Plant Management

Mangrove Trimming Guidelines for Homeowners
Florida Department of Environmental Protection

Mudflat Guide: Producers, Consumers, Decomposers - Student Booklet
The School District of Lee County, 2055 Central Avenue,
Fort Myers, Florida 33901

The Story of the Greater Charlotte Harbor Watershed
Charlotte Harbor National Estuary Program

Waterfront Property Owners Guide
Florida Department of Environmental Protection

Books

Florida's Birds: A Handbook and Reference
Herbert W. Kale, II and David S. Maehr
Pineapple Press - Sarasota, Florida
ISBN 0-910923-67-1

The Gulf of Mexico: A Treasury of Resources in the American Mediterranean,
Robert H. Gore
Pineapple Press - Sarasota, Florida
ISBN 1-56164-010-7

National Audubon Society Field Guide to Florida
Peter Alden, Rick Cech, Gil Nelson
Alfred A Knopf, Inc.
ISBN 0-679-44677-X

Peterson Field Guide to Southeastern and Caribbean Seashores:
Cape Hatteras to the Gulf Coast, Florida, and the Caribbean
Eugene H. Kaplan
Houghton Mifflin Company - Boston
ISBN 0-395-31321-X

The Seaside Naturalist: A Guide to Study at the Seashore
Deborah A. Coulombe
A Fireside Book, Simon & Schuster - New York
ISBN 0-671-76503-5

Seashore Plants of South Florida and the Caribbean
David W. Nellis
Pineapple Press - Sarasota, Florida
ISBN 1-56164-026-3

Swamp Song: A Natural History of Florida's Swamps
Ron Larson
University Press of Florida - Gainesville, Florida
ISBN 0-8130-1355-0

"In the end our society will be defined not only by what we create but what we refuse to destroy." **- John Sawhill**