



# PUBLIC NOTICE

## US Army Corps of Engineers, Honolulu District

Regulatory Office (CEPOH-RO)  
Building 230  
Fort Shafter, Hawaii 96858-5440

**Public Notice Date: JUNE 10, 2016**  
**Expiration Date: July 25, 2016**

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### INITIAL PUBLIC NOTICE

#### NATIONWIDE PERMIT REISSUANCE REQUEST FOR COMMENTS

On June 1, 2016, the U.S. Army Corps of Engineers published in the Federal Register its proposal to reissue the 50 existing nationwide permits (NWP) and issue two new NWP.

Nationwide permits are general permits issued on a nationwide basis to streamline the authorization of activities that result in no more than minimal individual and cumulative adverse environmental effects. Many of the proposed NWP require notification to the district engineer before commencing those activities, to ensure that the activities authorized by those NWP cause no more than minimal individual and cumulative adverse environmental effects.

National Issues Concerning the Proposed NWP: The Federal Register notice is the public's opportunity to comment on the proposed NWP, general conditions, and definitions. Comments on national issues relating to these NWP should be submitted to docket number COE-2015-0017 at [www.regulations.gov](http://www.regulations.gov), or by email to [NWP2017@usace.army.mil](mailto:NWP2017@usace.army.mil) or by mail to Headquarters, U.S. Army Corps of Engineers, Directorate of Civil Works, ATTN: CECW-CO-R, 441 G Street, N.W., Washington, D.C. 20314-1000. Instructions for submitting comments are provided in the June 1, 2016 Federal Register notice. Comments on the proposed NWP are due by August 1, 2016.

Regional Issues Concerning the Proposed NWP, Including Regional Conditioning: Division engineers are authorized to add regional conditions specific to the needs and/or requirements of a particular region or state. Regional conditions are important mechanisms to ensure that the adverse environmental effects of activities authorized by the NWP are no more than minimal, both individually and cumulatively. Division engineers may also suspend or revoke specific NWP in certain geographic areas (e.g., states or watersheds) or high-value aquatic systems where the adverse environmental effects caused by activities authorized by those NWP may be more than minimal. An enclosure for this public notice (Enclosure 1) lists the proposed regional conditions currently under consideration by the Pacific Ocean Division, Honolulu District Area of Responsibility (AOR) for the State of Hawaii, including the Northwestern Hawaiian Islands, the territories of American Samoa and Guam, the Commonwealth of the Northern Mariana Islands, and the U.S. Minor Outlying Islands (Baker Island, Howland

Island, Jarvis Island, Johnston Atoll, Kingman Reef, Midway Atoll, Palmyra Atoll, and Wake Island). The Honolulu District is seeking comments on the proposed regional conditions and seeking comments on the need for additional regional conditions to help ensure that the adverse environmental effects of activities authorized by the proposed NWP are no more than minimal, individually and cumulatively. Unless otherwise noted, all proposed regional conditions listed on this enclosure are applicable for activities in the Honolulu District AOR, as specified above. Comments on regional issues relating to the proposed NWP and proposed regional conditions should be sent in writing to: U.S. Army Corps of Engineers, Honolulu District Regulatory Office, ATTN: CEPOH-RO, Building 230, Fort Shafter, Hawaii 96858-5440 or via email at [POH.NWP@usace.army.mil](mailto:POH.NWP@usace.army.mil) . Comments relating to regional conditions are due by July 25, 2016. Similar public notices proposing regional conditions in other regions or States are being published concurrently by other division or district offices.

After the final NWP are issued, the final regional conditions will be issued after they are approved by the Division Commander. After the final NWP are issued, States and Tribes will make their Clean Water Act Section 401 (401) water quality certification and States will make their Coastal Zone Management Act (CZMA) consistency determination decisions. The 401/CZMA decisions must be made within 90 days of the Federal Register notice announcing the issuance of the NWP. The final NWP will go into effect on March 19, 2017.

Draft decision documents for each of the proposed NWP, which include environmental documentation prepared for the purposes of the National Environmental Policy Act, have been written by Corps Headquarters. The decision documents will address compliance of the NWP with the requirements for issuance under the Corps general permit authority. These documents, as well as the proposed NWP, are available for viewing at [www.regulations.gov](http://www.regulations.gov), docket number COE-2015-0017. Final decision documents will be prepared for the NWP that are issued. In addition, the final national NWP decision documents will be supplemented by division engineers to address their decisions concerning regional conditions for the NWP.

Enclosed is an index of the proposed NWP and conditions. Anyone wishing to provide comments may obtain a full text copy of the NWP through the Corps Home Page at <http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits/NationwidePermits.aspx>, at [www.regulations.gov](http://www.regulations.gov) in docket number COE-2015-0017, or at the Federal Register address listed below.

### **Index of Proposed Nationwide Permits, Conditions, and Definitions**

#### ***Nationwide Permits***

1. Aids to Navigation
2. Structures in Artificial Canals
3. Maintenance
4. Fish and Wildlife Harvesting, Enhancement, and Attraction Devices and Activities
5. Scientific Measurement Devices

6. Survey Activities
7. Outfall Structures and Associated Intake Structures
8. Oil and Gas Structures on the Outer Continental Shelf
9. Structures in Fleeting and Anchorage Areas
10. Mooring Buoys
11. Temporary Recreational Structures
12. Utility Line Activities
13. Bank Stabilization
14. Linear Transportation Projects
15. U.S. Coast Guard Approved Bridges
16. Return Water from Upland Contained Disposal Areas
17. Hydropower Projects
18. Minor Discharges
19. Minor Dredging
20. Response Operations for Oil or Hazardous Substances
21. Surface Coal Mining Activities
22. Removal of Vessels
23. Approved Categorical Exclusions
24. Indian Tribe or State Administered Section 404 Programs
25. Structural Discharges
26. [Reserved]
27. Aquatic Habitat Restoration, Establishment, and Enhancement Activities
28. Modifications of Existing Marinas
29. Residential Developments
30. Moist Soil Management for Wildlife
31. Maintenance of Existing Flood Control Facilities
32. Completed Enforcement Actions
33. Temporary Construction, Access, and Dewatering
34. Cranberry Production Activities
35. Maintenance Dredging of Existing Basins
36. Boat Ramps
37. Emergency Watershed Protection and Rehabilitation
38. Cleanup of Hazardous and Toxic Waste
39. Commercial and Institutional Developments
40. Agricultural Activities
41. Reshaping Existing Drainage Ditches
42. Recreational Facilities
43. Stormwater Management Facilities
44. Mining Activities
45. Repair of Uplands Damaged by Discrete Events
46. Discharges in Ditches
47. [Reserved]
48. Commercial Shellfish Aquaculture Activities
49. Coal Remining Activities
50. Underground Coal Mining Activities
51. Land-Based Renewable Energy Generation Facilities

- 52. Water-Based Renewable Energy Generation Pilot Projects
  - A. Removal of Low-Head Dams
  - B. Living Shorelines

***Nationwide Permit General Conditions***

- 1. Navigation
- 2. Aquatic Life Movements
- 3. Spawning Areas
- 4. Migratory Bird Breeding Areas
- 5. Shellfish Beds
- 6. Suitable Material
- 7. Water Supply Intakes
- 8. Adverse Effects from Impoundments
- 9. Management of Water Flows
- 10. Fills Within 100-Year Floodplains
- 11. Equipment
- 12. Soil Erosion and Sediment Controls
- 13. Removal of Temporary Fills
- 14. Proper Maintenance
- 15. Single and Complete Project
- 16. Wild and Scenic Rivers
- 17. Tribal Rights
- 18. Endangered Species
- 19. Migratory Bird and Bald and Golden Eagle Permits
- 20. Historic Properties
- 21. Discovery of Previously Unknown Remains and Artifacts
- 22. Designated Critical Resource Waters
- 23. Mitigation
- 24. Safety of Impoundment Structures
- 25. Water Quality
- 26. Coastal Zone Management
- 27. Regional and Case-by-Case Conditions
- 28. Use of Multiple Nationwide Permits
- 29. Transfer of Nationwide Permit Verifications
- 30. Compliance Certification
- 31. Activities Affecting Structures or Works Built by the United States
- 32. Pre-Construction Notification

***District Engineer's Decision***

***Further Information***

***Definitions***

Best management practices (BMPs)  
Compensatory mitigation  
Currently serviceable

Direct effects  
Discharge  
Enhancement  
Ephemeral stream  
Establishment (creation)  
High Tide Line  
Historic property  
Independent utility  
Indirect effects  
Intermittent stream  
Loss of waters of the United States  
Non-tidal wetland  
Open water  
Ordinary high water mark  
Perennial stream  
Practicable  
Pre-construction notification  
Preservation  
Re-establishment  
Rehabilitation  
Restoration  
Riffle and pool complex  
Riparian areas  
Shellfish seeding  
Single and complete linear project  
Single and complete non-linear project  
Stormwater management  
Stormwater management facilities  
Stream bed  
Stream channelization  
Structure  
Tidal wetland  
Vegetated shallows  
Waterbody

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### **HONOLULU DISTRICT REGIONAL CONDITIONS for the 2017 NATIONWIDE PERMITS (NWP)**

The Honolulu District Regulatory Office (Corps) has issued the following Regional Conditions as a means to ensure that projects authorized by NWP cause no more than minimal adverse environmental effects, individually and cumulatively. The additional restrictions or requirements imposed by the Regional Conditions avoid and/or minimize adverse impacts to resources of concern in the Corps' area of responsibility. Before the Corps will verify an activity under one or more NWPs, the proposed activity must comply with all applicable General and Regional Conditions.

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**APPLICABILITY:** The Corps Area of Responsibility (AOR) consists of the State of Hawaii, including the Northwestern Hawaiian Islands, the territories of American Samoa and Guam, the Commonwealth of the Northern Marianas Islands, and the U.S. Minor Outlying Islands (Baker Island, Howland Island, Jarvis Island, Johnston Atoll, Kingman Reef, Midway Atoll, Palmyra Atoll, and Wake Island).

#### **RESTRICTIONS:**

##### **Regional Condition 1 – Revoked Permits**

The following NWPs have been revoked from use within the Corps' AOR:

- NWP 21 - Surface Coal Mining Activities
- NWP 24 - Indian Tribe or State Administered Section 404 Programs
- NWP 34 - Cranberry Production Activities
- NWP 44 - Mining Activities
- NWP 49 - Coal Remining Activities
- NWP 50 - Underground Coal Mining Activities
- NWP 52 - Water-Based Renewable Energy Generation Pilot Projects

##### **Regional Condition 2 – Limited Use Areas**

NWPs may not be used to authorize activities adversely affecting, or resulting in the permanent loss of the ecologically sensitive and limited resources listed below unless the Corps determines that the activity would result in a net benefit or no more than minimal adverse impacts to the following aquatic resources\*.

- |   |                            |
|---|----------------------------|
| ▪ Allogenic Streams                             | ▪ Natural Freshwater Lakes |
| ▪ Anchialine Ponds                              | ▪ Phreatic Zones           |
| ▪ Cenotes                                       | ▪ Saline Lakes             |
| ▪ Coral Reefs                                   | ▪ Sea and Freshwater Caves |
| ▪ Mangroves (CNMI, Guam, and<br>American Samoa) | ▪ Sink Holes               |
| ▪ Montane Bogs                                  | ▪ Stream Caves             |
|   | ▪ Vadose Shafts            |

\*Definitions for these terms and others used throughout the Regional Conditions are provided at the end of the document.

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### **Regional Condition 3 – Acreage Limitation**

The maximum acreage of permanent loss to special aquatic sites for the total project may not exceed 0.10-acre resulting from any discharge of dredged or fill material, unless the Corps determines that the activity would result in a net benefit or no more than minimal adverse impacts to aquatic resources.

### **Regional Condition 4 – Stream Channelization and Impoundment Restriction**

NWPs may not be used to authorize permanent stream channelization or for the construction of dams that permanently impound waters of the U.S.

### **CONDITIONS APPLICABLE TO ALL NWPS:**

#### **Regional Condition 5 – NWP Verification**

A written NWP verification must be obtained from the Corps prior to conducting any activity authorized by the NWP (excludes NWPs listed in Regional Condition 1).

#### **Regional Condition 6 - Pre-Construction Notification (PCN)**

To obtain a NWP verification, all prospective permittees must submit a written PCN to the Corps that meets NWP General Condition (GC) #32.

#### **Regional Condition 7 – Additional PCN Information**

1. To comply with the PCN requirements at GC #32 your PCN must contain the following information to demonstrate your avoidance and minimization of adverse impacts to aquatic resources, and if applicable, endangered species, essential fish habitat and historic properties, including cultural resources. The level of detail submitted in your PCN should be commensurate with the anticipated degree of project-related impacts. Sources for information on endangered species, essential fish habitat, historic properties and cultural resources can be obtained from the Corps' website at <http://www.poh.usace.army.mil/Missions/Regulatory.aspx>.
  - a. For activities where federally-listed or proposed threatened and endangered species, including critical habitat, are known to occur within the project area, the PCN must contain the following information:
    - i. A list of species, both listed and proposed for listing, including designated critical habitat, known to occur within and in the near vicinity of the project impact area.

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- ii. BMP measures proposed to be implemented throughout the duration of construction to avoid and/or minimize adverse impacts to threatened and endangered species.
- b. For activities occurring in navigable waters of the U.S. (tidally-influenced nearshore and marine environments), the PCN must contain the following information:
- i. A list of Management Unit Species and associated Essential Fish Habitat (EFH) occurring within and in the near vicinity of the project impact area.
  - ii. A description of the existing environment within and in the near vicinity of the project impact area: characterization of the benthic substrate, water depth, distance from shore, tidal range (intertidal, subtidal, submerged), general characterization of water quality (temperature range, salinity, water circulation, turbidity).
  - iii. Measures to avoid and/or minimize adverse impacts to EFH and proposed mitigation, if applicable.
- c. For activities that have the potential to cause effect to historic properties, including cultural resources, the PCN must contain the following information:
- i. A description of any associated upland activities proposed under the same contract, project or funding.
  - ii. A list of any known historic properties within the project area and in the near vicinity eligible for listing on the National Register that meet the eligibility criteria at 36 CFR 60.4.
  - iii. A list of all interested parties, including Native Hawaiian Organizations (NHO), members of the community, etc., solicited for input on the proposed activity.
  - iv. Copies of any correspondence from the State Historic Preservation Division, any NHO, or any other consulted party regarding the potential impacts of the proposed activity on historic properties, including cultural resources.
  - v. A list of resources, (e.g. published documents, assessments, surveys, etc.) you reviewed to provide response to items i-v, above.
  - vi. BMP measures proposed to be implemented throughout the duration of construction to avoid and/or minimize adverse impacts to historic properties, including cultural resources.
2. For activities that would result in the permanent loss of waters of the U.S., including special aquatic sites, you must provide a discussion of on-site design configurations considered that demonstrate the preferred design would result in the least adverse impact to aquatic resource and function.



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### **Regional Condition 8 - Best Management Practices**

To the extent applicable, the following standard BMPs must be implemented for all NWP's to avoid and/or minimize adverse impacts on environmental resources:

#### *Pre-construction BMPs:*

1. Prior to commencement of ground-disturbing activities (e.g., clearing, grubbing, grading) and/or other work conducted in waters of the U.S., including navigable waters of the U.S., the permittee must clearly identify (demarcate) in the field the geographic limits of the waters of the U.S. (i.e., Ordinary High Water Mark, High Tide Line, Mean High Water Mark, and/or wetland boundary) as verified by the Corps in its approved or preliminary jurisdictional determination.
2. The permittee must also demarcate in the field the project limits of the Corps-authorized area of impact to ensure that construction work does not impact jurisdictional areas beyond the authorized limits. The delineation of these geographic limits and boundaries may be accomplished by staking, flagging, painting, silt fencing, signage, buoys, etc. and in all cases must be maintained and remain observable throughout the construction period.

#### *During Construction BMPs:*

1. Turbidity and the suspension or re-suspension of sediment from project-related work must be minimized and contained to the immediate vicinity of the authorized activity through the appropriate use of effective containment devices or measures and based on project-specific conditions. Silt fences, silt curtains, or other diversion or containment devices must be installed to contain sediment and turbidity at the work site (a) parallel to, and along the toe of any fill or exposed soil which may introduce sediment to an adjacent aquatic site; and (b) adjacent to any fill placed or soil exposed within an aquatic site. All silt fences, curtains, and other devices must be installed according to the manufacturer's guidelines and properly maintained throughout the construction period and until the impact area is stabilized and/or elevated turbidity levels have returned to ambient levels.
2. All project-related materials (e.g., fill, rocks, landscaping, structures, etc.) and equipment (e.g., dredges, barges, backhoes, etc.) authorized to be used or placed in waters of the U.S., including wetlands, must be free of invasive plant and animal species.
3. Any temporary tethering, anchoring, mooring or similar in-water structural components must be placed in a manner to avoid direct physical impact to coral and

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seagrass beds during installation and throughout the duration of its use in waters of the U.S.

4. Any temporary in-water structures must be removed of, in their entirety, upon completion of the authorized work in or affecting waters of the U.S.
5. Unless specifically authorized, stockpiling of project-related materials (e.g., fill, dredged material, revetment rock, pipe, etc.) or unsuitable materials (e.g., trash, debris, car bodies, asphalt, etc.) in the aquatic environment or in close proximity to waters of the U.S. such that the stockpiled materials could be carried into waters of the U.S. by wind, rain, or high surf is prohibited.
6. Upland containment areas sited in uplands near waters of the U.S. for the purpose of stockpiling, dewatering, etc. must be bounded by impermeable material to prevent return flows of dewatered effluent into waters of the U.S.

### *Post-Construction BMPs:*

1. Native species suitable for the impacted habitat must be considered for re-vegetation for the purposes of restoring areas temporarily disturbed by the authorized work to their pre-disturbance condition.

## **ACTIVITY-SPECIFIC REGIONAL CONDITIONS:**

### **Regional Condition 9 – Bank Stabilization**

1. For new bank stabilization projects in streams with vegetated slopes and/or natural bed and bank, vegetative and environmentally sensitive stabilization practices must be used whenever practicable. Documentation of consideration of environmentally sensitive bank stabilization practices must be included in the PCN. Environmentally sensitive stabilization techniques incorporate organic materials to produce functional structure, provide wildlife habitat, and/or provide areas for re-vegetation.
2. For new shoreline stabilization projects, environmentally sensitive designs that provide wave dissipation, interstitial spaces for fish, crustacean and invertebrate habitat, and other environmental benefits must also be used whenever practicable.
3. Examples of environmentally sensitive bank stabilization practices include, but are not limited to, the use of the following:
  - a. adequate sized armoring keyed into the toe of the slope with native plantings on the banks above;
  - b. vegetated geogrids;

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- c. coconut fiber coir logs;
- d. live woody vegetated cuttings;
- e. fascines or stumps;
- f. brush layering;
- g. soil lifts.

### **Regional Condition 10 – Road Crossings**

1. For culverts, the upstream and downstream invert must be embedded to allow the natural substrate to colonize the structure's bottom, encourage fish movement, and maintain the existing channel slope. Culvert slope should match adjacent elevations. The width of the base flow culvert(s) must be approximately equal to the average channel width to promote the safe passage of fish and other aquatic organisms. Culvert(s) must not permanently widen/constrict the channel or reduce/increase stream depth. Multiple pipe culverts may not be used to receive base flows.
2. The permittee must clearly label the construction drawings to include existing and proposed grading contours, all structures associated with the installation of the crossing such as wing walls, rock and concrete protection measures, existing and proposed utilities lines, outfalls and associated structures. A detailed narrative must accompany the construction plans and describe all work to be performed as indicated on the plans.
3. All in-stream work, such as the installation of cofferdams or water diversion devices, the removal of accumulated sediments, and any demolition work, must be clearly labeled on the construction drawings and explained in detail in project narrative.
4. If dewatering of the site is required in order to perform work in waterways, the site must be dewatered for work in the dry and dewatering must be temporary only. No in-stream work will be authorized unless soil erosion and sediment control measures are deemed acceptable by the District.
5. The permittee must establish and maintain a protective upland buffer composed of native plants (or other appropriate vegetation approved by the District) within the right-of-way adjacent to all waters of the U.S.

### **Regional Condition 11 is applicable to the following NWPs:**

**NWP 29 – Residential Developments**

**NWP 39 – Commercial and Institutional Developments**

**NWP 42 – Recreational Activities**

1. The permittee must establish and/or enhance an upland buffer of suitable native plants (or other appropriate vegetation approved by the District) adjacent to all

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created, restored enhanced or preserved waters of the U.S., including wetlands within the project site. Buffers will be measured horizontally from the limits of federal jurisdiction.

- a. For streams or other waters that do not qualify as wetland, the buffer must be a minimum of 25-feet from the Ordinary High Water Mark.
- b. For wetlands, the buffer must be a minimum of 10-feet from the edge of the wetland.

The District may allow encroachment within the required buffers on a case-by-case basis. However, it is the responsibility of the applicant to provide supporting documentation as to why the buffer requirement cannot be met.

Stormwater and detention facilities that are planted with natural vegetation may be located within the outer 50% of the buffer.

2. All remaining, created, restored, or enhanced waters of the U.S. and adjacent buffers on the project site must be protected in perpetuity under an appropriate mechanism, such as a deed restriction, conservation easement, or other appropriate means. A draft deed restriction and exhibit must be provided with the notification. This requirement may be waived at the discretion of the District if there are long term protections already in place.
3. The applicant must design the project to include the preservation of natural features such as streams, ephemeral drainages, steep slopes, significant wildlife areas, wetlands, sensitive aquifers, montane bogs, natural freshwater lakes, saline lakes, mangroves, and other natural aquatic sites within the project location.
4. If stormwater facilities are required for the project, they must be designed to protect water quality, preserve natural hydrology, and minimize overall impacts of the development on aquatic resources. Stormwater facilities must be designed to maximize the removal and transformation of runoff pollutants. Design elements to be considered include, but are not limited to the following: vegetated detention basins, natural bio-swales, depressed islands, native plantings, and other water quality protection measures.

### **Regional Condition 10 – Avoidance and Minimization of Adverse Impacts to Endangered Species, Historic Properties and Essential Fish Habitat**

*The Corps is actively soliciting input from the appropriate federal, state, territory and local agencies to develop measures to avoid and/or minimize impacts to threatened and endangered species, historic properties including cultural resources, and essential fish habitat.*

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## DEFINITIONS

**Allogenic streams:** Streams flowing from an impervious surface, such as volcanic rock into porous limestone. Example: in Northern Guam, such streams will percolate into the ground and can flow into the marine environment from subsurface channels.

**Anchialine ponds:** Marine or brackish water bodies that have no surface connection but that, through permeable substrates, have subsurface hydrologic connection to the ocean.

**Cenotes:** Sinkholes open to the surface and extending into groundwater.

**Coral Reefs:** As defined at 40 CFR 230.44 (Clean Water Act, Section 404(b)(1) Guidelines), coral reefs consist of the skeletal deposit, usually of calcareous or siliceous materials, produced by the vital activities of anthozoan polyps or other invertebrate organisms present in growing portions of the reef.

**Phreatic zones:** The zones along a coast where freshwater and saltwater mix usually causing rapid dissolution of limestone with a resulting cave formation

**Montane Bogs:** An area found in a mountainous region where rainfall exceeds drainage. Dominant vegetation is shrubs, sedges, and grasses.

**Natural Freshwater Lakes:** Standing water that is always fresh, in well-defined natural basins, with a surface area usually greater than 0.25 acre and in which rooted emergent hydrophytes, if present, occupy no more than 30 percent of the surface area. Freshwater lakes characteristically lack a natural oceanic connection (surface or subsurface) of a magnitude sufficient to cause demonstrable tidal fluctuations.

**Saline Lakes:** Standing waters of salinities ranging from brackish to hypersaline, located in well-defined natural basins, and lacking a natural surface connection to the ocean. They are usually, but not always, fed by seawater seepage and may be diluted by rainwater, overland runoff, or groundwater, or concentrated by evaporation.

**Mangroves:** In American Samoa, Commonwealth of the Northern Mariana Islands, and Guam, mangroves are coastal areas dominated by the species *Bruguiera gymnorrhiza* (Oriental Mangrove), *Rhizophora mangle* (Red Mangrove), *Avicennia marina* (Grey Mangrove) and/or *Lumnitzera littorea*.

**Sea and Freshwater Caves:** A hollow place in the earth formed primarily by the wave action of the sea or natural weathering of rock by groundwater.

**Sinkholes:** Caves formed when a water formed cave either collapses or is opened up by adequate dissolution of limestone by water.

**Special Aquatic Site:** Geographic areas, large or small, possessing special ecological characteristics of productivity, habitat, wildlife protection, or other important and easily disrupted ecological values. These areas are generally recognized as significantly influencing or positively contributing to the general overall environmental health or vitality of the entire ecosystem of a region. Special aquatic sites are identified in 40 CFR 230 Subpart E as sanctuaries and refuges, wetlands, mud flats, vegetated shallows, coral reefs, and riffle and pool complexes.

**Stream caves:** A series of caves formed by water flowing through limestone usually structurally complex.

**Vadose Shafts:** Vertical shafts in limestone that allows rapid passage of water into the ground water lens.