RESTORE Act Direct Component Best Available Science (BAS) Training

Office of Gulf Coast Restoration
U.S. Department of the Treasury
May 2017

Training objectives:

- Participants understand when best available science (BAS) is required and how it is evaluated
- Participants understand the requirements for addressing best available science in grant applications

Topics to be covered:

- What is best available science (BAS)?
- What projects require a BAS determination?
- How will Treasury evaluate a BAS determination?
- Which Treasury-awarded grants have included a BAS review?
- What information is required in a BAS determination?
- Where can a state, county or parish find scientific information for its BAS determination?
- What are tips for a successful BAS review?

RESTORE Act Final Rule:

"Activities designed to protect or restore natural resources must be based on best available science." *(31 CFR 34.201)*

What is best available science (BAS)?

Science that

- maximizes the quality, objectivity, and integrity of information, including statistical information
- uses peer-reviewed and publicly available data
- clearly documents and communicates risks and uncertainties in the scientific basis for such projects.

(31 CFR 34.2 – definition of best available science in RESTORE Act Final Rule)

What projects require a BAS determination?

- A BAS determination must be included in grant applications for projects designed to protect or restore natural resources
- A BAS determination may be required for any eligible activity, depending on the nature of the project and its objectives

Eligible activities for Direct Component grants:

- Restoration and protection of the natural resources, ecosystems, fisheries, marine and wildlife habitats, beaches and coastal wetlands of the Gulf Coast region
- Mitigation of damage to fish, wildlife and natural resources
- Implementation of a federally approved marine, coastal, or comprehensive conservation management plan, including fisheries monitoring
- Workforce development and job creation
- Improvements to or on State parks located in coastal areas affected by the Deepwater Horizon oil spill
- Infrastructure projects benefitting the economy or ecological resources, including port infrastructure
- Coastal flood protection and related infrastructure
- Planning assistance
- Promotion of tourism in the Gulf Coast region, including recreational fishing
- Promotion of the consumption of seafood harvested from the Gulf Coast region

Example: artificial reef project

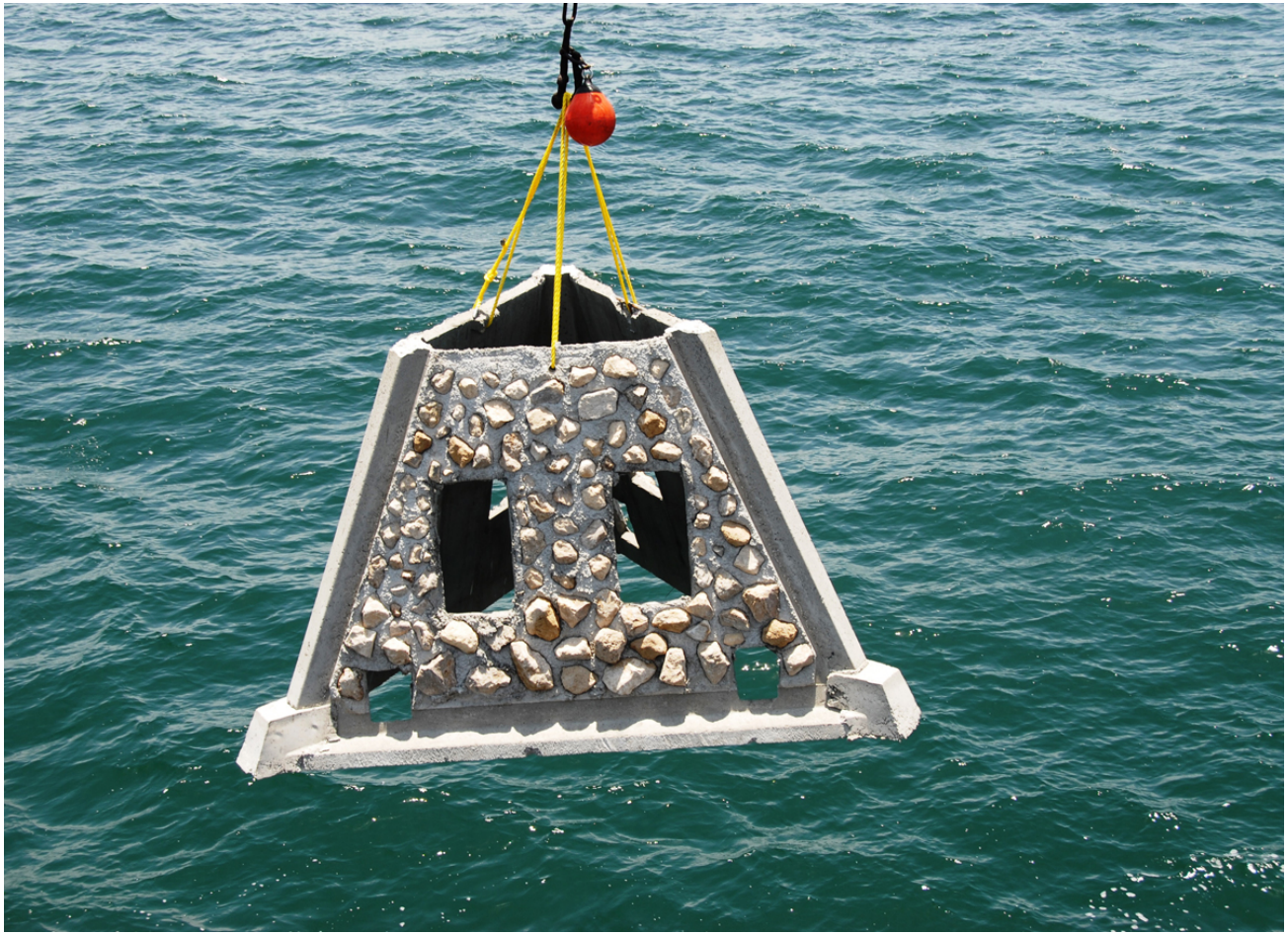


Photo: nmfs.noaa.gov

BAS question from the Direct Component grant application:

The applicant proposing an activity designed to protect or restore natural resources must explain their determination that the project is based on the 'best available science.' In addressing the three-pronged test for 'best available science,' the applicant must cite peer-reviewed, objective, methodologically sound literature sources that support the conclusion that the proposed scope of work is an effective way to achieve the stated objectives, when available.

The applicant must provide:

- A summary of the peer-reviewed information that justifies the proposed objectives, including methods used for the proposed activity.
- A summary of the literature sources' conclusions and any uncertainties or risks in the scientific basis that would apply to the proposed activity.
- A summary of how, if the information supporting the proposed activity does not directly pertain to the Gulf Coast Region, the applicant's methods reasonably support and are adaptable to that geographic area.
- A summary of an evaluation of uncertainties and risks in achieving the project's best available science objectives over the longer term.

How will Treasury evaluate a BAS determination?

- Treasury will review applications to determine whether the applicant answered the BAS question fully
- Subject matter expert reviewers will evaluate if the applicant's determination is reasonable that the proposed project is based on BAS
  - Timeframe: approximately 2-3 weeks
- Expert reviewers may request additional information or clarification that Treasury conveys to the applicant

Which Treasury-awarded grants have included a BAS review?

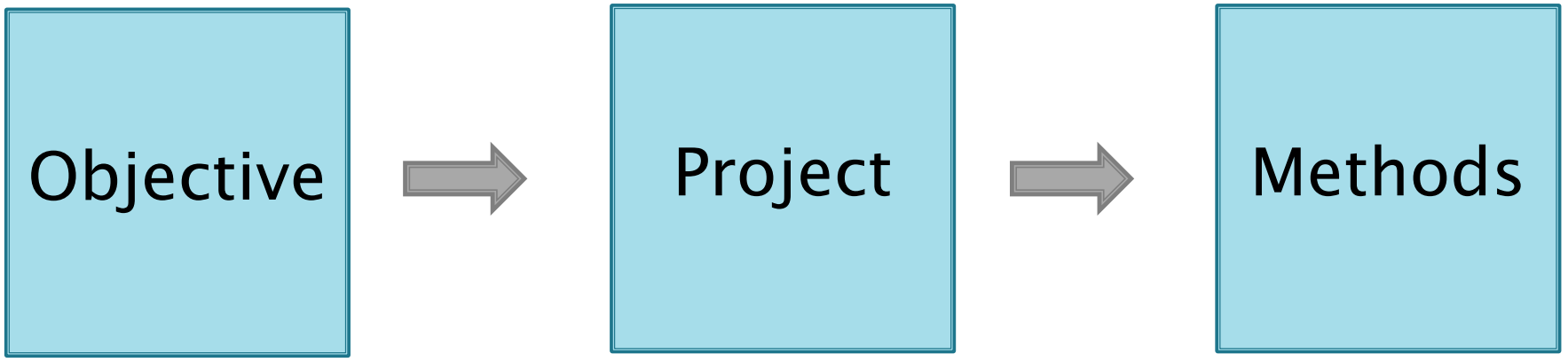
Entity	Project Title	Award Amount
Louisiana Coastal Protection and Restoration Authority	Engineering and Design of the Calcasieu River Salinity Control Construction Project	$16,000,000
Pinellas County	Ft. De Soto Park Dune Walkovers	$534,890
Charlotte County	Restoring Bay Scallops in Charlotte Harbor	$113,424

What information is required in a BAS determination?

Applicants must:

- Explain how the project's natural resource protection and/or restoration objectives and proposed methods are based on BAS
- Summarize any risks or uncertainties associated with the project and explain how these risks will be mitigated
- Cite and describe peer-reviewed literature or publicly available data

Explain how the project's natural resource protection and/or restoration objectives and proposed methods are based on BAS



Evidence for objective

Evidence for project

Evidence for methods

Example: dune walkover project

Photo: gulfspillrestoration.noaa.gov

Example: dune walkover project

1. State the natural resource protection/restoration objective of the project clearly and specifically.

Objective

Reduce dune disturbance

Tips and suggestions for project objectives:

- Be as clear and specific as possible
- Projects can have multiple objectives
- Frame objectives in the context of natural resource restoration and/or protection

  Example: The natural resource protection objective is *to reduce dune disturbance*.

  - NOT to build a dune walkover.
  - NOT to restore dune habitat or bird nesting habitat if it is really to reduce disturbance to the dunes from foot traffic.

Example: dune walkover project

2. Provide documentation for the current site conditions and evidence of need for improvement.

Objective

Reduce dune disturbance

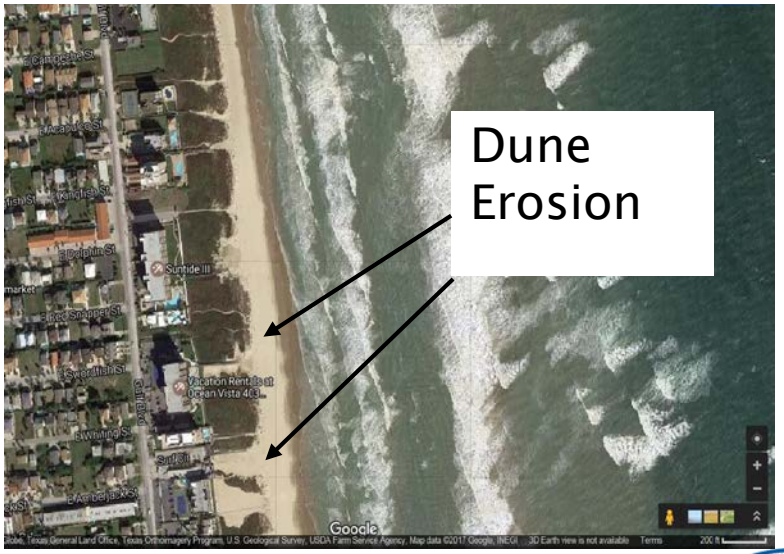
Support with evidence of disturbance at the site

Ex: pictures, observations, or survey data

Tips and suggestions for documenting current site conditions:

- Consider documenting baseline conditions at the project site with surveys or other collection of data
- If known, describe any underlying causes of the impairment

Example: Provide evidence that dunes are being disturbed (e.g., photos from the ground and/or aerial photos) and that pedestrian activity is a cause of the disturbance (e.g., visitor data or photos showing foot traffic).

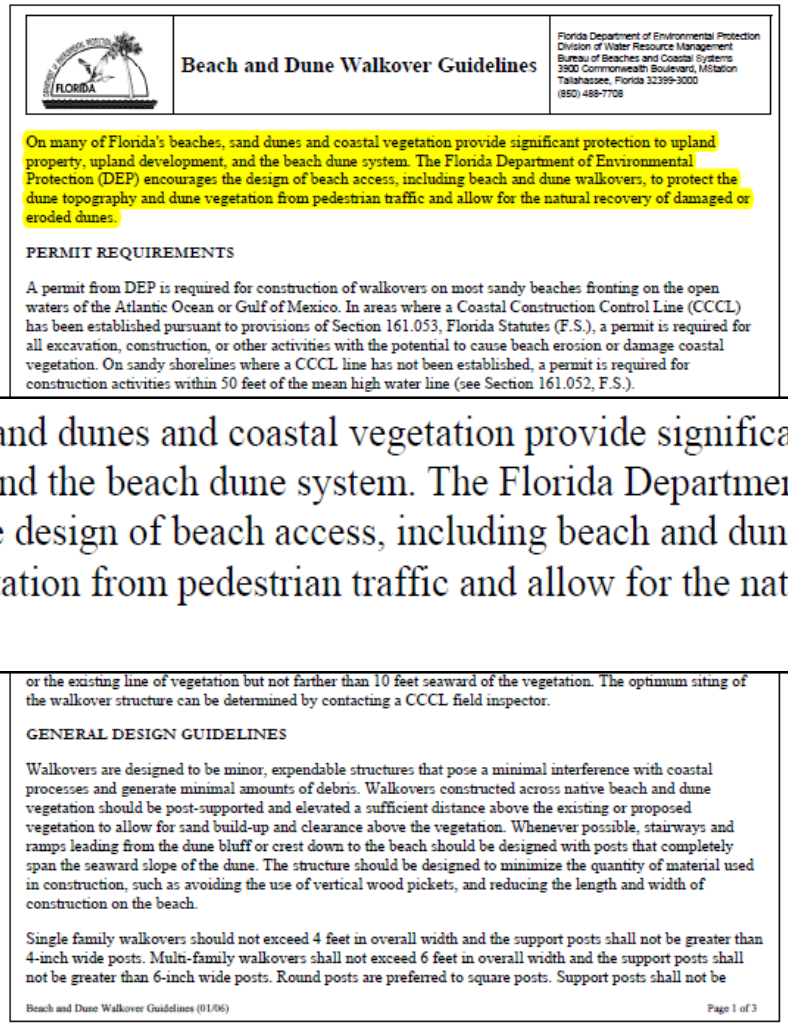


Example: dune walkover project

3. Describe the proposed project and provide support that it will achieve the stated restoration objective.

Objective	Project
Reduce dune disturbance	Build a dune walkover
Support with evidence of disturbance at the site Ex: pictures, observations, or survey data	Support with evidence that a dune walkover will reduce disturbance Ex: FDEP dune walkover guidelines

Beach and Dune Walkover Guidelines from the Florida Department of Environmental Protection (FDEP)



Beach and Dune Walkover Guidelines

Florida Department of Environmental Protection
Division of Water Resource Management
Bureau of Beaches and Coastal Systems
3900 Commonwealth Boulevard, MStation
Tallahassee, Florida 32399-3000
(850) 488-7708

On many of Florida's beaches, sand dunes and coastal vegetation provide significant protection to upland property, upland development, and the beach dune system. The Florida Department of Environmental Protection (DEP) encourages the design of beach access, including beach and dune walkovers, to protect the dune topography and dune vegetation from pedestrian traffic and allow for the natural recovery of damaged or eroded dunes.

PERMIT REQUIREMENTS

A permit from DEP is required for construction of walkovers on most sandy beaches fronting on the open waters of the Atlantic Ocean or Gulf of Mexico. In areas where a Coastal Construction Control Line (CCCL) has been established pursuant to provisions of Section 161.053, Florida Statutes (F.S.), a permit is required for all excavation, construction, or other activities with the potential to cause beach erosion or damage coastal vegetation. On sandy shorelines where a CCCL line has not been established, a permit is required for construction activities within 50 feet of the mean high water line (see Section 161.052, F.S.).

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or the existing line of vegetation but not farther than 10 feet seaward of the vegetation. The optimum siting of the walkover structure can be determined by contacting a CCCL field inspector.

GENERAL DESIGN GUIDELINES

Walkovers are designed to be minor, expendable structures that pose a minimal interference with coastal processes and generate minimal amounts of debris. Walkovers constructed across native beach and dune vegetation should be post-supported and elevated a sufficient distance above the existing or proposed vegetation to allow for sand build-up and clearance above the vegetation. Whenever possible, stairways and ramps leading from the dune bluff or crest down to the beach should be designed with posts that completely span the seaward slope of the dune. The structure should be designed to minimize the quantity of material used in construction, such as avoiding the use of vertical wood pickets, and reducing the length and width of construction on the beach.

Single family walkovers should not exceed 4 feet in overall width and the support posts shall not be greater than 4-inch wide posts. Multi-family walkovers shall not exceed 6 feet in overall width and the support posts shall not be greater than 6-inch wide posts. Round posts are preferred to square posts. Support posts shall not be

Example: dune walkover project

4. Describe the project and provide evidence that the proposed project will achieve the stated objective.

Objective	Project
Reduce dune disturbance	Build a dune walkover
Support with evidence of disturbance at the site Ex: pictures, observations, or survey data	Support with evidence that a dune walkover will reduce disturbance Ex: FDEP dune walkover guidelines

A dune walkover will reduce disturbance caused by pedestrian traffic and allow natural recovery of the dune (FDEP 2006).

Tips and suggestions for documenting the ability of the proposed project to achieve the objective:

- For restoration projects, provide evidence that site conditions are suitable for recovery
  - **Oyster restoration example:** For an oyster restoration project, provide documentation that the environmental conditions at the project site are suitable for oysters.
- Uncertainties about the project's ability to achieve the objective should be discussed when risks and uncertainties are addressed

Photo: CC courtesy of Paul Asman and Jill Lenoble

Example: dune walkover project

5. Describe the specific methods that will be used and provide evidence that they are based on BAS and support the achievement of the stated objective.

Objective	Project	Methods
Reduce dune disturbance	Build a dune walkover	Design and construction specifics: height, materials, location, etc.
Support with evidence of disturbance at the site Ex: pictures, observations, or survey data	Support with evidence that a dune walkover will reduce disturbance Ex: FDEP dune walkover guidelines	Support with evidence of BMPs or design guidelines/criteria Ex: FDEP dune walkover guidelines

Beach and Dune Walkover Guidelines from the Florida Department of Environmental Protection (FDEP)

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Division of Water Resource Management
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Permits for walkovers contain standard conditions that require construction to be conducted in a manner that minimizes short-term disturbance to the dune system and existing vegetation. Replacing vegetation destroyed during construction with similar plants suitable for beach and dune stabilization is required. Only limited excavation for the placement of support posts is authorized, and construction of walkovers may not occur during the marine turtle-nesting season, which extends May 1 through October 31 (except for Brevard through Dade counties, which extends March 1 through October 31).

GENERAL SITING GUIDELINES

The walkover shall be designed and sited to protect dune features, to minimize disturbance of native vegetation, to not restrict lateral beach access and to minimize the amount of construction material that may become debris during a storm. Elevated walkovers are not required for all beach accesses, such as in sparsely vegetated, low profile dune areas where on-grade sand or shell paths are suitable for controlling foot traffic. Walkovers should generally be constructed perpendicular to the shoreline and extend at least to the seaward toe of the frontal dune or the existing line of vegetation but not farther than 10 feet seaward of the vegetation. The optimum siting of the walkover structure can be determined by contacting a CCCL field inspector.

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Single family walkovers should not exceed 4 feet in overall width and the support posts shall not be greater than 4-inch wide posts. Multi-family walkovers shall not exceed 6 feet in overall width and the support posts shall not be greater than 6-inch wide posts. Round posts are preferred to square posts. Support posts shall not be

encased in concrete nor installed into dune slopes that are steeper than approximately 30 degrees. Support posts should have a minimum 5 feet of soil penetration. Applicants should consult with the Bureau prior to requesting a permit for a walkover that contains switchbacks, long ramps or other features required to comply with the Americans with Disabilities Act Accessibility Guidelines.

WALKOVER ELEVATION GUIDELINES

Site conditions affecting walkover heights vary as the structure traverses the beach/dune system. The ground cover changes from the uplands, commonly covered with woody scrub or coastal strand vegetation (saw palmetto/sea grape/scrub oaks),over a dune bluff or one or several dune crest(s), covered with either coastal strand or coastal grassland (sea oats/bitter panicum/marsh hay), down the slope to the dry sand beach, either uncovered bare escarpment or partially covered with beach/dune vegetation (railroad vine/sea rocket/sea oats). The type of structure and height from the dune bluff or crest down to the beach also must be considered in setting the walkover elevation. Increased elevation of the structure requires a longer run to the beach and additional construction material within this high energy area. This creates additional storm generated debris, sea turtle nesting habitat impacts, sand losses due to storm wave scour, and interferes with people's ability to walk along the beach.

Walkover Elevations in Uplands. The upland environment of coastal scrub/coastal strand habitat is characterized by more stable soil conditions with less blowing sands and infrequent storm overwash events. The stable conditions allow for the development of a mature woody vegetation and saw palmetto dominated plant community. In addition to thick above ground stem and leaf vegetation between 5 and 15 feet in height, this plant community has an extensive below ground woody root mat. Walkovers in these upland habitats need be elevated only a sufficient distance above the ground to avoid disturbance of the soil and root systems or cutting of low tree and palmetto trunks. An elevation of the stringers from 6" to 2'-0" above existing grade should be sufficient. Walkover elevations crossing coastal wetlands within upland areas may require increased elevations. Elevation of the walkover above the leaf canopy is in most cases impractical in coastal scrub or coastal strand habitats.

Walkover Elevations over Bluffs. The low stringer elevation recommended for uplands can be carried to an eroded bluff line. This will reduce the length of a ramp or walkover down to the beach. Again the objective the walkover elevation is to reduce damage to coastal scrub soils and root systems.

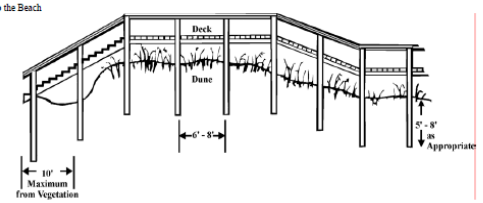
Walkover Elevations over Dune Crests. Dune environments are characterized by mobile sands subject to storm effects (which lower grade elevations) and wind effects (which can raise elevation as sand is trapped). Dunes are dominated by coastal grassland plants adapted to the dynamic environment. These include sea oats, bitter panicum, and little bluestem. Walkovers sited within active dune systems are required to be elevated sufficiently to allow for sand movement and growth of vegetation. Walkover designs published in "Beach/Dune Walkover Structures" referenced below specify a 3'-10" minimum clearance from existing grade to the bottom of the stringers of an up to 6-foot wide (overall dimension) multi-family or public beach access structures, and a 3'-0" minimum clearance to the top of the deck for an up to 4-foot wide single family structures.

Walkover Elevations on Seaward Dune or Bluff Slopes. The elevation of the walkover at the dune crest and the distance of the seaward terminus from the water's edge determine the height of the steps or ramps crossing the seaward slope. The design objective is to get the structure down to the beach in as short a shore-normal (perpendicular to the shoreline) distance as possible while reducing the shore-parallel coverage of the slope. Department guidelines require that the seaward terminus of the structure be no farther seaward than 10 feet from the line of permanent beach dune vegetation or the toe of the frontal dune. Reducing the seaward encroachment and shore-parallel width decreases the potential for storms interacting with the structure, occupation of sea turtle nesting habitat by the structure, and interference with lateral public beach access. Walkovers designed for the Americans with Disabilities Act often increase the length of walkover ramps on the beach. This requires the need for a site specific review for environmental impacts. The burial of the ramp or

step terminus a minimum amount (0.5 to 1.0 feet)-foot below grade may allow for use of the walkover after some lowering of the beach elevation from minor storms. However, placement of this terminus below the depth of a post storm beach profile is discouraged as this portion of the walkover will most likely have been damaged by larger storms and to have interfered with coastal processes.

On Grade Walkovers. Elevated walkovers are not necessary in all site conditions and use situations. Where dune development is minimal, beach dune vegetation sparse or use infrequent, on-grade footpaths may be preferred. The Department discourages solid concrete walks and footpath surfaces such as stepping stones that create debris or missiles. Other surfaces such as geotextile fabrics, cabled wood planks, or shell require a case by case review. No permanent path surfaces are allowed seaward of the dune or within sea turtle nesting habitat.

TYPICAL WALKOVER PROFILE



References

Beach/Dune Walkover Guidelines, the Florida Bureau of Beaches and Coastal Systems, Florida Department of Environmental Protection, Revised January 1998.

Beach/Dune Walkover Structures, SUSF-SG-76 by Todd L. Walton, Jr., and Thomas C. Skinner. Published by the Marine Advisory Program of the Florida Cooperative Extension Service and the Florida Sea Grant, March, 1983.

- General Siting Guidelines
- General Design Guidelines
- Walkover Elevation Guidelines
- Typical Walkover Profile Diagram

Tips and suggestions for project methods:

- Describe the project's methods as precisely as possible
  - Don't cite multiple methods without detailing which will be or are likely to be used
  - Don't include information on techniques that will not be used
- Include a monitoring plan if monitoring is included in the project description
- If certain details or information are unknown, but will be developed as part of the project, state this directly and provide basic guidelines or best management practices that will be followed to develop those details
- If possible, select the methods from citable references or public sources that best support the achievement of the natural resource protection and/or restoration objective

EX.1

Objective	Project	Methods
Reduce dune disturbance	Build a dune walkover	Design and construction specifics: height, location, etc.
Support with evidence of disturbance at the site	Support with evidence that a dune walkover will reduce disturbance	Support with evidence of design guidelines/criteria or BMPs

EX.2

Objective	Project	Methods
Restore dune system	Plant sea oats	Planting details: plant type, spacing, timing, etc.
Support with evidence that the habitat function of the dune system is impaired	Support with evidence that planting native plants will help restore the dune system habitat	Support with evidence of design guidelines/criteria or BMPs

What information is required in a BAS determination?

Applicants must:

- Explain how the project's natural resource protection and/or restoration objectives and proposed methods are based on BAS
- Summarize any risks or uncertainties associated with the project and explain how these risks will be mitigated
- Cite and describe peer-reviewed literature or publicly available data

List foreseeable risks and uncertainties and explain how they will be mitigated.

Examples:

- Construction of a dune walkover could interfere with nesting sea turtles. To mitigate the risk to sea turtles, no construction will occur during the nesting season (May—October).
- Hurricanes can destroy dune walkovers. To mitigate the risk, the walkover will use adapted construction methods and materials (e.g. breakaway decking)

Types of issues to consider:

- Could natural resources be negatively affected by the project?
  - Could any other habitats or wildlife be adversely affected?
  - Could exotic or invasive species be introduced?
  - Could water flow/sedimentation/etc. be negatively altered?
- Are there possible or likely reasons the project may not be successful at achieving its objective?
  - If native plants or animals are being reintroduced, are environmental conditions suitable for their success?
  - Could theft or vandalism be a problem?
- Over what time frame are the benefits of the project expected?
  - Could storm surges, hurricanes, or sea level rise impair the project over time?
  - What is the anticipated longevity of the project and its results?
- Are there uncertainties in the underlying science used to justify the project and/or methods?

What information is required in a BAS determination?

Applicants must:

- Explain how the project's natural resource protection and/or restoration objectives and proposed methods are based on BAS
- Summarize any risks or uncertainties associated with the project and explain how these risks will be mitigated
- Cite and describe peer-reviewed literature or publicly available data

Tips and suggestions for finding information sources for BAS:

- Talk to local universities, Sea Grant Offices, libraries, state and federal natural resource agencies, RESTORE Act Centers of Excellence, National Estuaries Programs, or National Estuarine Research Reserves for assistance
- Use search tools, such as Google Scholar, ResearchGate, EBSCO, Web of Science or ProQuest, to find scientific journal articles
- Cite references from sources relevant to the proposed project
- Contact your grants management specialist for examples of sources used in previous grant applications
- Consult federal and state agency websites for best management practices guidelines, management plans, monitoring plans, etc.

Questions to consider when selecting sources:

- Is the source peer-reviewed or publicly available?
- How recently was the source published?
- Is the source directly relevant to the Gulf Coast?
  - If work is based in another region, usage and relevance must be justified by describing how findings are applicable to and methods will be adapted for conditions in the Gulf
  - Examples of issues to consider: differences in tides, salinity, currents, wildlife, temperature, etc.
- Is the main body of relevant literature represented in the cited sources?
  - Sources with negative and/or inconclusive findings should be included and addressed when discussing risks and uncertainties.

Citing sources:

- Summarize relevant information from sources and connect to the project objectives and methods as clearly as possible
- Include parenthetical citations in text with a list of full citations at the end of the BAS narrative

Example: Dune walkovers will be constructed 3-10 feet above the dune to allow for sand movement and vegetation growth (FDEP 2006).

Citing sources:

Citations for peer-reviewed scientific journal articles should include:

- Authors
- Publication date
- Title of article
- Title of journal
- Volume and page numbers

Example: Arnold, W.S., Marelli, D.C., Bray, C.P., and Harrison, M.M. 1998. Recruitment of bay scallops *Argopecten irradians* in Floridan Gulf of Mexico waters: scales of coherence. Marine Ecology Progress Series 170:143-157.

Citing sources:

Citations for other sources should include:

- As much information as possible (authors, date, title, etc.), including the date of access
- PDFs of documents or links to websites, as necessary

Example: Florida Department of Environmental Protection (FDEP). 2006. Beach and dune walkover guidelines. Prepared by the Florida Bureau of Beaches and Coastal Systems. Revised January, 2006. Accessed 3/10/2017. www.dep.state.fl.us/beaches/publications/pdf/wlkovrgl06.pdf

Summary – General tips and suggestions:

- Consider BAS when selecting projects for MYPs in development
- Consider including the development of BAS documentation as part of a planning assistance project or feasibility study
- Be as clear as possible with the objectives of the project
- The BAS determination needs to include the required information in sufficient detail, but it can be concise; there is no minimum length or number of sources
- Include any relevant design or planning documents (feasibility studies, design documents, design specifications, design drawings, environmental compliance permits, etc.)

Questions?

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