Habitat Design Criteria
Salton Sea Management Program

**California Department
of Fish and Wildlife**

**Presentation to the:
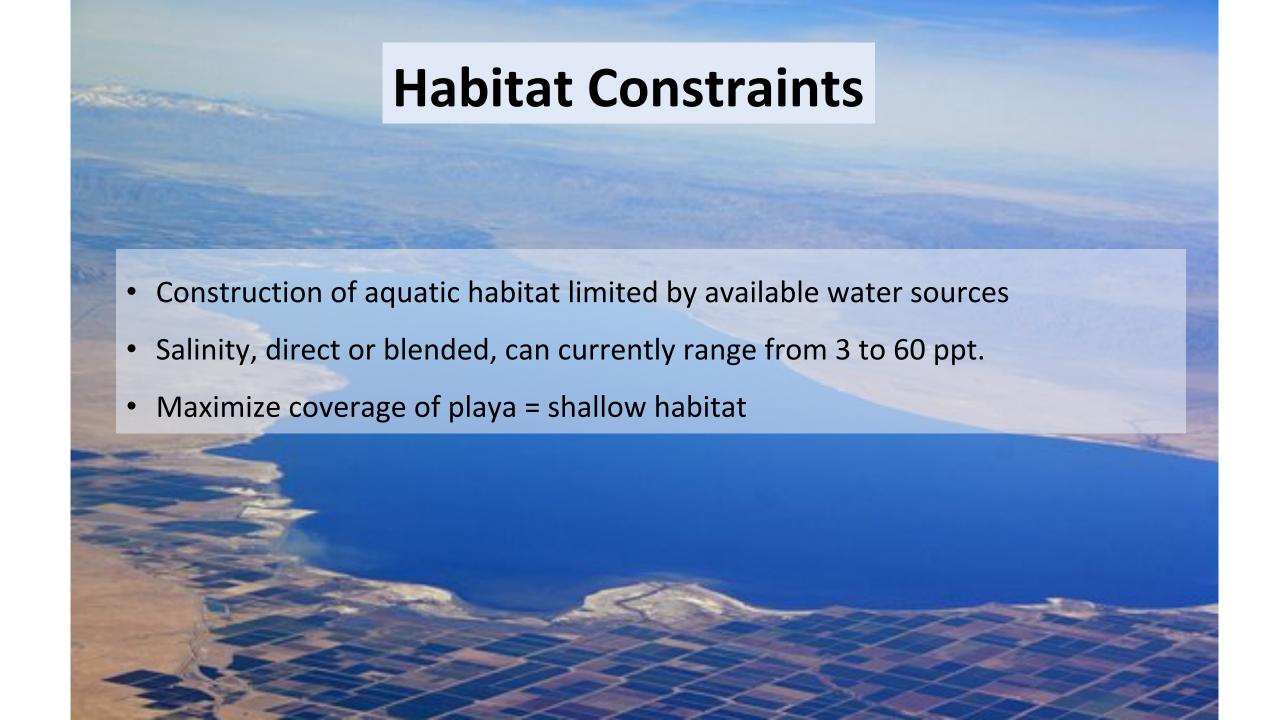SSMP Science Committee
January 30, 2018**

**SSMP 10 Year Plan Committee
February 7, 2018**

Summary and Purpose

Salton Sea Management Program will design and construct habitat projects

Habitat Design Criteria:

- Guide development of project specific habitat objectives

- Achieve Habitat Goals for aquatic habitat projects of the SSMP

- Considers fish and bird habitat needs, site limitations, and risks

- Modify based on new information

Habitat Constraints

- Construction of aquatic habitat limited by available water sources

- Salinity, direct or blended, can currently range from 3 to 60 ppt.

- Maximize coverage of playa = shallow habitat

Habitat Goals

- Create habitat that supports fish, such as tilapia, to provide a food source for piscivorous birds

- Create habitat that supports desert pupfish

- Provide heterogeneity of conditions such as salinity, flow, water depth, bathymetry, substrate, and vegetation to foster complexity of fish and invertebrate communities to provide diverse foraging opportunities for birds

- Create structural elements for varied bird use, such as islands, berms, and snags for colony bird nesting and loafing

Habitat Design Criteria and SSMP Project Design and Implementation

Broad criteria to inform physical habitat design
- All Habitat Design Criteria may not apply to every SSMP project
- All Habitat Goals may not be achieved by every SSMP project
- Criterion Specific or General

SSMP project-specific documents
- Specify additional habitat objectives consistent with the criteria
- Develop more specific criteria to incorporate into Habitat Design Criteria
- Evaluate and manage risks and uncertainties
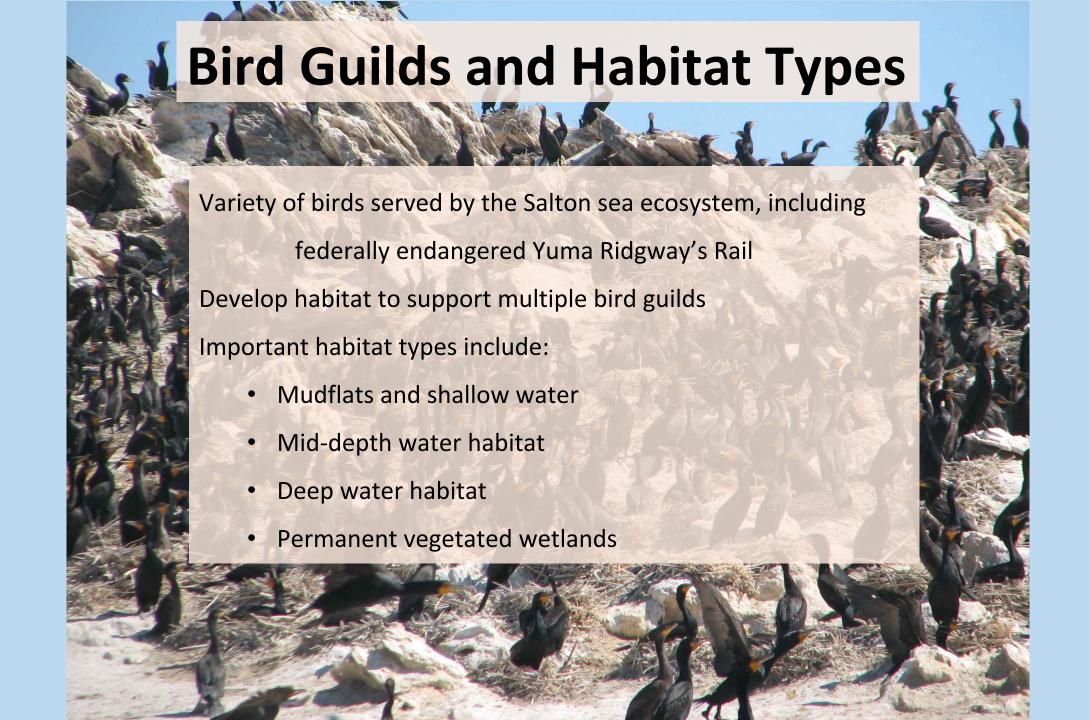
SSMP programmatic objectives and targets for habitat
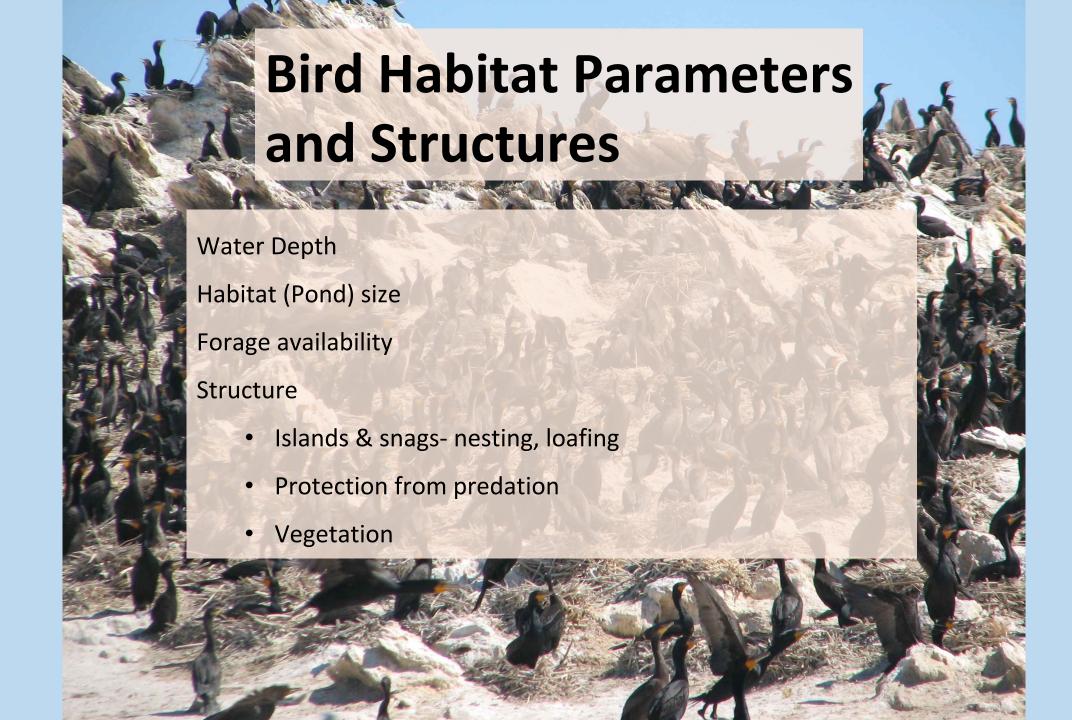
Monitoring and Adaptive Management Plan
- Evaluate Habitat Design Criteria and inform revisions

Water Quality

- Salts

- Selenium

- Fertilizers

Fish Habitat

- Salinity
- Water depth
- Bathymetry
- Substrate
- Nutrients
- Temperature

Desert Pupfish

- State and federally listed, only native fish to the Salton Sink
- Salinity
- Dissolved Oxygen
- Water depth
- Flow
- Substrate
- Vegetation
- Connectivity

Bird Guilds and Habitat Types

Variety of birds served by the Salton sea ecosystem, including

federally endangered Yuma Ridgway's Rail

Develop habitat to support multiple bird guilds

Important habitat types include:

- Mudflats and shallow water

- Mid-depth water habitat

- Deep water habitat

- Permanent vegetated wetlands

Bird Habitat Parameters and Structures

Water Depth

Habitat (Pond) size

Forage availability

Structure

- Islands & snags- nesting, loafing

- Protection from predation

- Vegetation

Habitat Design Criteria

Salinity – Ponds for fish will range from 3- 40 ppt (20-40 ppt preferred)
- Ponds most distant from water management ponds will become hypersaline

Depth - Range of depths from inches to 10 feet
- Extensive, open shallow water less than 6 inch depth (3 -6 inches preferred)
- Deeper areas to support tilapia, thermal refugia, reproduction

Bathymetry – Variability, gradually sloped
- Support a range of fish and bird habitat types

Habitat (Pond) Size – Mostly greater than 75 acres

Habitat Design Criteria

Flow – Low velocity to minimize turbidity and allow for movement (for desert pupfish)

Connectivity – Movement among habitats

Bird Habitat Structure– Develop project-specific objectives
- Create islands and snags for nesting and loafing birds
- Reduce predation risk

Sediments** – Native soil constituents
- Grain composition, sediment depth, and rugosity

Vegetation** - Forage and cover
- Submerged or emergent; depending on salinity

*_**Use of native materials and biological recruitment_*

Uncertainty and Risk Management

Selenium

- Risks can be modeled and anticipated, but not completely eliminated

- Identify objectives and targets for risk management

- Monitor selenium levels and biological endpoints

Nutrients

- High nutrient levels may result in continuing vulnerability to episodic low oxygen events

- Synergy of nutrient levels with water residence time, water temperature, wind, air temperature, and water depths important to assess risk

Water temperature

- Water temperatures may exceed the limits for fish survival

- Modification of depth and water volume can minimize risk

Next Steps

Science Committee review and other Committee input

Develop project-specific habitat objectives consistent with criteria

Develop Programmatic objectives and targets for habitat

Develop Monitoring and Adaptive Management Plan

Periodic re-assessment of Habitat Design Criteria