DELTA LANDSCAPE SCENARIO PLANNING TOOL

A tool to assist users with developing, analyzing, and evaluating different restoration and land use scenarios in the Delta.

Overview: This project, funded by the Delta Stewardship Council, will create a tool to assist users with developing, analyzing, and evaluating different restoration and land use scenarios in the Delta. In its first iteration, the tool will calculate how proposed restoration and management projects will impact a suite of landscape metrics that relate to desired ecosystem functions. While the initial focus of the tool will be on such metrics, the tool will be developed in a modular fashion that allows for a wide range of future analyses (including metrics related to agriculture, water supply, flood control, recreation, and other important considerations). Ultimately, we envision a tool that can help the users analyze the landscape at multiple scales. For example, the tool could quantify how a single proposed project would alter metrics in its immediate surroundings, or how a larger regional strategy comprised of many individual projects would cumulatively impact the whole Delta. A tool that can quickly evaluate key metrics in a repeatable and standardized way will help agencies and other stakeholders anticipate how projects will affect performance measures (such as those required under the Delta Plan) and track actual progress towards goals and objectives as projects are implemented.

Scenario development: To assist with the process of scenario development (the creation and digitization of alternative restoration and land use scenarios), the project plans to develop several resources. First, SFEI will compile and produce spatial datasets that can inform the development of science-based restoration scenarios, such as maps of elevation and historical and contemporary habitat types. A key component of these guiding datasets will be spatially-explicit maps of restoration opportunities and landscape potential. These restoration opportunities, which are based on SFEI's "Delta Landscapes Project," will serve as a pre-developed menu of complementary and locally-appropriate potential restoration and management projects that can serve as a starting point for users developing their own scenarios. In addition to being made available in a single GIS data package, the guiding datasets will also be added to an online web map that allow users without GIS capabilities to view and utilize the layers. Possible scenarios to initially evaluate using the tool include projects planned under the CNRA EcoRestore initiative, the Delta Public Lands Strategy, and a "business as usual scenario" that looks at the possible impacts of continued urban development, subsidence, and, sea-level rise on the current landscape.

Tool development:
SFEI AQUATIC SCIENCE CENTER

Tool funding:
Delta Stewardship Council

Project timeline:
through April 2020

Contact:
sams@sfei.org

Are used to inform the development of...

Which are analyzed to generate and compare...

Guiding datasets:

- Landscape restoration opportunities
- Elevation
- Historical & contemporary habitats
- Sediment supply, soil conditions, groundwater supply
- Infrastructure (levees, intakes, roads, etc.)
- Plus more...

Landscape scenarios:

- EcoRestore
- Delta Public Lands Strategy
- Individual project design alternatives
- "Business as usual" (urban development, subsidence, and sea-level rise)

Landscape analyses & metrics:

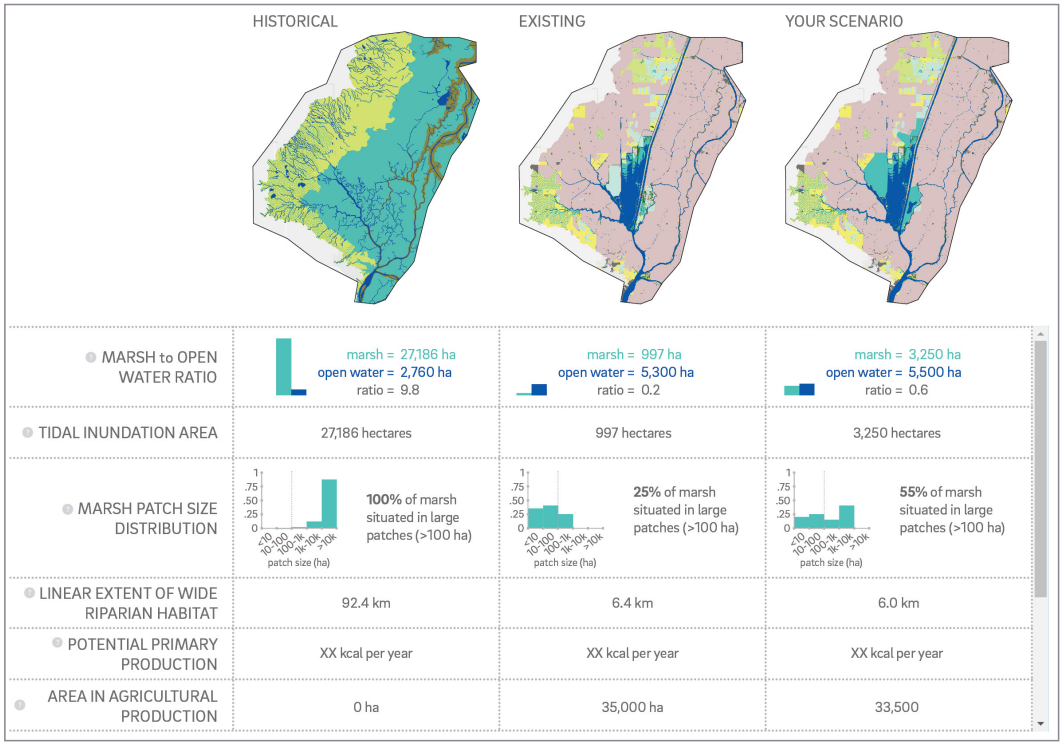
- Extent of habitat types
- Marsh patch size, distance, core area
- Riparian corridor width
- Inundation extent by type
- Acres with subsidence reversal or carbon sequestration practices
- Ecosystem services
- Plus others based on the needs of the user-community

Scenario analysis: The landscape scenario planning GIS tool will analyze user-generated landscape scenarios using a variety of metrics. The initial focus of this task will be to develop the tool's capabilities to evaluate a suite of well-established landscape metrics ("the Delta Landscapes metrics"; SFEI-ASC 2014). These landscape metrics, originally developed as part of the Delta Landscapes Project, were specifically designed to evaluate support for desired ecosystem functions at the landscape scale, have received substantial review from local scientists, and are already situated within a science foundation for landscape-scale restoration (SFEI-ASC 2016). Other priority metrics for initial development might include a selection of Delta Plan performance measures, or simple metrics related to agriculture, water supply, flood control, or recreation. Final metrics will be determined with input from potential tool users to determine priorities and feasibility. This part of the tool will be designed for users with a working knowledge of basic GIS software.

Scenario evaluation: Once scenario analysis is complete, the landscape scenario planning tool will output results in formats that are useful for agency staff, restoration planners, and other stakeholders. At a minimum, these tool outputs will include tabular or graphic data with quantitative outputs for each metric/analysis. Depending on the needs of users identified through a workshop, the tool could also automatically generate a report that compares scenarios, compares the calculated metrics against established targets/baselines, characterizes the functional implications of the anticipated changes in metrics, or highlights potential modifications to the scenario (based on, for example, problematic components or missed opportunities).

Project outreach: In addition to creating a website to provide access to the tool and related resources, SFEI will host multiple meetings to set project priorities and receive feedback on tool prototypes. Once the tool is completed, SFEI will also host a series of training sessions. Please contact Sam Safran at sams@sfei.org for more information.

Hypothetical tool outputs *for a scenario in the northwest Delta (numbers are only examples).*



Examples of potential tool uses & applications

- Allow Delta Plan agencies to predict the impacts and track the actual effects of restoration projects on Delta Plan performance measures
- Operationalize the use of science-based landscape metrics in the planning process
- Assist grant-making agencies with evaluating landscape -level effects of proposed projects
- Integrate results from multiple models