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A DELTA RENEWED USER GUIDE

A Delta Renewed User Guide aims to increase the accessibility of the technical findings in A Delta Renewed for easier application to restoration and conservation efforts across the Delta. The recommendations in A Delta Renewed focus on landscape-scale ecological guidance. We present three examples of how the information in A Delta Renewed might be used to address different management and restoration questions. Because of the complexity of the Delta system, this guide does not address all possible questions and does not replace the need for detailed, site-specific data and expertise. Rather, it shows how the information in A Delta Renewed might provide a common foundation for restoration planning.

The *User Guide* was written for a broad audience, including restoration practitioners, landowners, and local, state and federal agencies. The guide provides a step-by-step path through *A Delta Renewed*; a user is walked through how to apply the findings of the report via a series of steps to address each of the three restoration and management questions. This process is intended to help the user access regionally-specific recommendations and strategies to plan and manage future Delta landscapes that can support desired ecological functions over the long term.

The goal of *A Delta Renewed* and this guide is not to recreate the Delta of the past. Rather, the objective is to understand how we can re-establish or mimic important natural processes and patterns within this altered system to support desirable ecological functions (such as healthy native fish populations, a productive food web, and support for endangered species), now and into the future.

Delta Landscapes Terminology

The following terms reflect important concepts in the Delta Landscapes reports, and are referenced frequently in this User Guide. See the referenced pages for how these terms are defined for this project.

Ecological Functions -see A Delta Transformed, pages 8-10

Metrics - see A Delta Transformed, pages 11-14

Guiding Principles - see A Delta Renewed, page 17

Process-based Strategies - see A Delta Renewed, pages 39-44

Connections to Other Efforts

A Delta Renewed is intended to be one of many tools in the region's toolbox. Many other social and economic issues, as well as some environmental ones (including invasive species management, land use decisions on private land, flow requirements, restoration funding, ongoing management and monitoring) need to be addressed as restoration moves forward. Other efforts in the Delta are integrating information from A Delta Renewed with these and other considerations. For example, A Delta Renewed is one of many inputs to CDFW's Delta Conservation Framework. The Delta Conservancy's Regional Planning efforts, as another example, consider how the recommendations from A Delta Renewed can be balanced with agricultural and economic needs.

Delta Landscapes User Guide Workshop

On July 25, 2017, The Delta Conservancy, in partnership with the Water Education Foundation and the San Francisco Estuary Institute - Aquatic Science Center, hosted a workshop to test-run an early version of this *A Delta Renewed* User Guide. Workshop participants included representatives from the Delta Science Program, Delta Conservancy, state and federal agencies, consultants, and landowners: 79 people in all.

Workshop participants provided valuable feedback on the draft User Guide, resulting in revisions made in this version, including

- Clearer explanation that this is a guide to using A
 Delta Renewed for restoration and conservation,
 rather than a guide for Delta restoration and
 conservation more broadly
- Clearer instructions and simplification of some steps, with more explanation of A Delta Renewed terminology

Many workshop participants commented that some of these questions would be better served with more dynamic, map-based tools that could take advantage of the spatial data layers and metrics developed in the Delta Landscapes project. If such a tool is developed, feedback from the workshop can be incorporated into that effort.





Cosumnes River Preserve.
Photograph courtesy of Bob Wick (BLM).

Delta Landscapes User Guide Questions

This User Guide is organized into three sections, each focused around a specific question, that represent specific ways Delta stakeholders might use the information in *A Delta Renewed*. The **first question** addresses planning restoration actions at particular site, offering suggestions on how to connect that site to the larger landscape. The **second question** focuses on where and how to restore a particular habitat type across the Delta, prioritizing process-based strategies to achieve that goal. The **third question** is about maximizing particular ecological functions across the Delta. The reader is encouraged to use read whichever of these questions is most relevant to their work (questions do not need to be read in order).

This User Guide presents a multi-step approach to answering each question. In each step, readers will be prompted to engage with material from *A Delta Renewed* (or the preceding report, *A Delta Transformed*) and asked to record observations. At the end of each question, a summary sheet is provided to record notes.

QUESTION 1: How to link actions at a particular restoration site to landscape conditions?

- > STEP 1: Identify process-based strategies (by zone)
- > STEP 2: Consider landscape configuration
- **STEP 3:** Understand ecological functions
- > STEP 4: Integrate with other drivers

QUESTION 2: How to identify priority areas for restoration of particular habitat types?

- > STEP 1: Identify process-based strategies (by habitat type)
- **STEP 2:** Consider important processes
- **STEP 3:** Consider landscape configuration
- **STEP 4:** Integrate with other drivers

QUESTION 3: How to maximize support for a particular ecological function across the Delta (or subregion)?

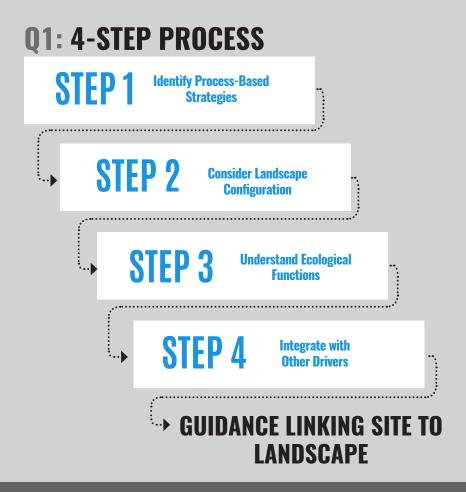
- **STEP 1:** Identify function and review change over time
- **STEP 2:** Consider function recommendations
- **STEP 3:** Consider useful strategies
- **STEP 4:** Integrate with other drivers



Photograph by Shira Bezalel (SFEI-ASC).

QUESTION 1: How to link actions at a particular restoration site to landscape conditions?

The Delta Landscapes Project provides resources that focus at the landscape scale, and does not provide detailed site level recommendations (i.e., exact design specifications). However, the approach presented here can help landowners, restoration practitioners and regulators decide what to do in a particular location by providing guidance about how site-level actions might link up to larger landscape conditions to maximize restoration benefits to native wildlife. Our suggested approach to using *A Delta Renewed* to answer this type of question uses a four-step process:



ADDITIONAL NOTES: This effort addresses how *A Delta Renewed* can help answer the question of what to do at a particular restoration site, however there are many additional important factors not addressed by *A Delta Renewed* that must be considered.

In laying out steps to answer this question we assume the site in question is one with a willing landowner who is interested in supporting conservation on site.

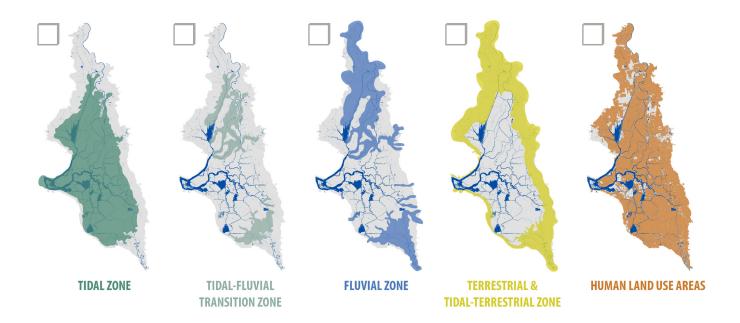
STEP 1: Identify process-based strategies

A Delta Renewed identifies different zones in the Delta where different physical processes are dominant, and as a result where different restoration strategies are appropriate. Use the set of maps below to help identify which zone(s) the site of interest falls within. Note that zones are overlapping and their boundaries are flexible, so one parcel could fall in multiple zones.

DELTA RENEWED

see Introduction to Process-based Strategies, pgs. 40-42

Check the box for the zone(s) that encompass the site of interest. See additional guidance for determining the appropriate zone on pages of 41-42 of A Delta Renewed.



A Delta Renewed identifies nine "process-based strategies" that relate to the different zones in the Delta. Once you have identified the relevant zone(s) for the site of interest, use the key below to identify the appropriate strategies for that zone. Some zones have only one associated strategy, while others have multiple associated strategies.

Review the questions below to determine which strategies are most appropriate within the zone that encompasses your site of interest (based on the boxes checked on page 28). Check the appropriate box(es) on page 11.

Does the site have sizeable portions located at intertidal elevation (either now or with up to 6 ft. of sea-level rise)? If so, check Strategy A (Re-establish tidal marsh processes in areas at intertidal elevations) in the table on the next page.

TIDAL ZONE Does the site have sizeable portions that are subsided? If so, check Strategy B (Re-establish marsh processes in subsided areas) in the table below.

Does the site contain a tidal channel or flooded island? Did it historically support any tidal channels? If so, check Strategy C (Re-establish tidal zone processes in channels and flooded islands) in the table on the next page.

TIDAL-FLUVIAL TRANSITION ZONE

Check Strategy D (Re-establish connections between streams and tidal floodplains) in the table on the next page.

FLUVIAL ZONE Check Strategy E (Re-establish fluvial processes along streams) in the table on the next page.

TERRESTRIAL AND TIDAL-TERRESTRIAL ZONE Does the site contain portions that are contiguous with an existing tidal marsh? If not, does it contain portions that are contiguous with an area that is situated at intertidal elevation (or could be with up to 6 ft of sea-level rise)? In either case, check Strategy F (Re-establish tidal-terrestrial transition zone processes) in the table on the next page.

Does the site contain portions that are not contiguous with an area situated at intertidal elevation (or one that will be with up to 6 ft of sea-level rise; e.g., areas that are situated well above tidal influence)? If so, check Strategy G (Re-establish connected terrestrial habitats around the periphery of the Delta) in the table on the next page.

HUMAN LAND USE AREAS Does the site contain portions that are used for agriculture? **If so, check Strategy H** (**Expand** wildlife-friendly agriculture) in the table on the next page.

Does the site have significant urban developments? If so, check Strategy I (Integrate ecological functions into urban areas) in the table on the next page.

For each strategy, *A Delta Renewed* provides a series of physical process guidelines and landscape configuration and scale guidelines that offer advice for how the strategies should be implemented.

Explore guidelines for the strategies relevant to the site of interest, using the table below to find the right place in *A Delta Renewed*.

Strategy Group	Strategie	References in Delta Transformed	
Restore TIDAL ZONE	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	Re-establish tidal marsh processes in areas at intertidal elevations	pgs. 46-47
processes	B	Re-establish marsh processes in subsided areas	pgs. 50-51
		Re-establish tidal zone processes in channels and flooded islands	pgs. 54-55
Restore TIDAL-FLUVIAL TRANSITION ZONE processes		Re-establish connections between streams and tidal floodplains	pgs. 58-59
Restore FLUVIAL ZONE processes	E	Re-establish fluvial processes along streams	pgs. 62-65
Restore TERRESTRIAL &		Re-establish tidal-terrestrial transition zone processes	pgs. 68-69
TRANSITION ZONE processes		Re-establish connected terrestrial habitats around the periphery of the Delta	pgs. 72-73
Integrate ecological	H	Expand wildlife-friendly agriculture	pgs. 76-79
processes with HUMAN LAND USES		Integrate ecological functions into urban areas	pgs. 80-81



	Record any notes on how key processes might be either maintained, restored, or emulated at your site in the space below. Note: many aspects of restoring natural physical processes relate to watershed management and flows that are beyond site-scale control, and will require broader coordination. Consider how the timing and phasing of strategies can play a key role.
*	RESPONSE:

STOP and SUMMARIZE: Using the summary sheet on page 22, record which high-level restoration strategies you have identified as most appropriate for your area, and important considerations related to physical processes.

STEP 2: Consider landscape configuration

A Delta Renewed has a set of guiding principles that address considerations for achieving ecological resilience at a landscape scale. The guiding principles related to landscape configuration are listed on the following pages. Use the prompts in the following pages to consider how these concepts apply to a particular site.

Step 1 pointed to more detailed guidance from *A Delta Renewed* for each process-based strategy. The table below points to additional guidance by habitat type from *A Delta Transformed*.

	References in Delta Transformed
For freshwater emergent wetland	pg. 50-55
For riparian forest or scrub	pg. 64-67
For tidal-terrestrial transition zone	pg. 72-73
For floodplains	pg. 38-41
For channels and flooded islands	pg. 30-33

Restore appropriate landscape connectivity.	DELTA RENEWED
* RESPONSE: How do landscape connectivity considerations influence what should be done of (e.g., does this site have potential to fill a critical gap in connectivity for a particular habit it close to potential source populations? Does it connect among habitat types in a way the historical configuration?)	tat type? Is
Restore landscapes with a focus on <i>complexity and diversity</i> .	DELTA RENEWED
* RESPONSE: How might conservation actions at this site contribute to habitat diversity at the scale? How does this influence what might be done on site? (e.g., will actions at this site underrepresented habitat types that contribute to native biodiversity)? Will actions creat in areas that span important gradients and contribute to within-habitat type diversity?	create Guiding Principle #5
· · · · · · · · · · · · · · · · · · ·	

Create <i>redundancy of key landscape elements</i> , populations, and habitat types.	DELTA RENEWED
* RESPONSE: Do actions at this site have the potential to provide key redundancy in terms of habitat patches or populations of priority species?	see Guiding Principle #6 pg. 24
Restore at <i>large scales</i> .	DELTA RENEWED
* RESPONSE: Do actions at this site offer opportunities to achieve restoration at a desirable scale? Do these actions help to meet goals for the amount of a particular habitat type in the Delta overall?	see Guiding Principle #7 pg. 25

	Restore with a <i>long time horizon</i> in mind.	DELTA RENEWED
*	RESPONSE: How are habitats at this site expected to evolve over time (especially in light of climate change and sea-level rise)? Do the conditions necessary to support that evolution exist? Will proposed actions prevent the implementation of future actions that might provide more ecosystem	see Guiding Principle #7 pg. 25
	benefits?	

STOP and SUMMARIZE Using the summary sheet on page 22, record landscape configuration considerations that are important for deciding what to do on site.

SUPPORTED FUNCTIONS

STEP 3: Understand ecological functions

A Delta Renewed provides recommendations for how to support important ecological functions in the Delta. The table below can help determine which functions may be supported at this site, based on the process-based strategies identified in Step 1 (box(es) checked on page 11). Review recommendations (page numbers on opposite page) for the ecological functions that are most relevant to the site.

			ડા	JEFUK				
	STRATEGY SUPPORTS FUNCTIONSTRATEGY HIGHLY SUPPORTS FUNCTION	Life History Support for Native Fish	Life History Support for Marsh Wildlife	Life History Support for Riparian Wildlife	Life History Support for Waterbirds	Life History Support for Edge Wildlife	Primary Productivity	Biodiversity
	Re-establish tidal marsh processes in areas at intertidal elevations				0	0		
	Re-establish marsh processes in subsided areas	0				0	0	
	Re-establish tidal zone processes in channels and flooded islands		0					
ES	Re-establish connections between streams and tidal floodplains	•			0	0		
STRATEGIES	Re-establish fluvial processes along streams	•	0		0	0	0	
STF	Re-establish tidal-terrestrial transition zone processes		0	0	0	•	0	
•	Re-establish connected terrestrial habitats around the periphery of the delta		0	0	0	•	0	
	Expand wildlife-friendly agriculture	0	0					0
	Integrate ecological functions into urban areas		0	0				0

FOR ADDITIONAL INFORMATION	References in Delta Renewed				
Guidance for supporting native fish	pg. 85				
Guidance for supporting edge wildlife	pg. 101				
Guidance for supporting marsh wildlife	pg. 89				
Guidance for supporting riparian wildlife	pg. 93				
Guidance for supporting waterbirds	pg. 97				
RESPONSE: Would the conservation actions being for ecological functions? Are there recommendations and consideration	ations that pro				
for ecological functions? Are there recommend	ations that pro				
for ecological functions? Are there recommend	ations that pro				
for ecological functions? Are there recommend	ations that pro				
for ecological functions? Are there recommend	ations that pro				
for ecological functions? Are there recommend	ations that pro				

STOP and SUMMARIZE Using the summary sheet on page 22, record which ecological functions are likely to be supported, and what key recommendations to support these functions could be fulfilled by actions at this site.

STEP 4: Integrate with other drivers

In this step consider how ecological recommendations from *A Delta Renewed* interface and integrate with other land uses—now and into the future—and how this might affect the considerations in Steps 1-3. Consider also the ongoing engagement that would be needed or desired on site, including adaptive and ongoing management.

see Guiding Principle #1 pgs. 18-19

In the Delta, considerations related to people, institutions, and infrastructure are described in more detail under *Guiding Principle 1: Appreciate that people are part of the Delta*.

These considerations include:

- Integrating ecological, social, and economic resilience
- Supporting wildlife in developed and agricultural lands
- Coordinating policy and planning
- Implementing adaptive management
- Recognizing the need for ongoing management
- Taking advantage of infrastructure upgrades
- Prioritizing multi-benefits projects
- Convening stakeholder meetings
- Planning at the landscape scale

NOTE: While these are very important considerations, they are only briefly discussed in *A Delta Renewed*. Additional tools, efforts, and resources are needed to better address these concerns.

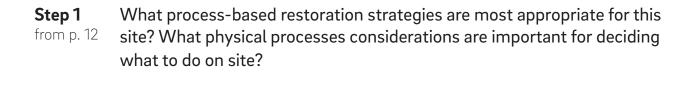
*	RESPONSE: Are there social or economic concerns that would change how ideas from Steps 1-3 might be implemented or prioritized? Do management and policy considerations affect which recommendations from Steps 1-3 should be prioritized, or how they might be implemented? Are there critical knowledge gaps about this site that need to be addressed? Are there opportunities to better integrate benefits for both people and nature
	(e.g., working lands, co-benefits of restoration)? Note applicable recommendations and considerations here:

STOP and SUMMARIZE Using the summary sheet on page 22, record what considerations about integrating with other land uses in the Delta might change how recommendations from Steps 1-3 might be implemented or prioritized.



SUMMARY SHEET

QUESTION #1: What can I do at this site if I'm interested in ecosystem restoration?



Step 2 What landscape configuration considerations are important for deciding what to do on site?

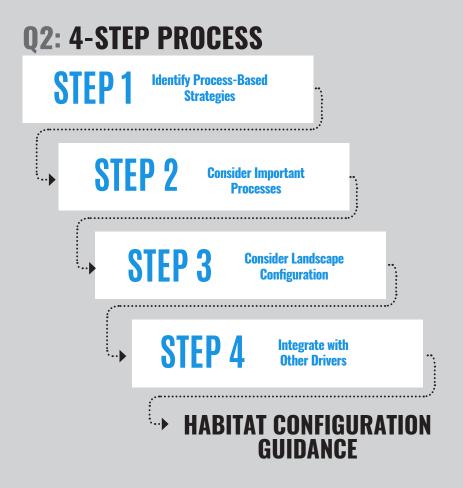
Step 3 What ecological functions are likely to be supported? What key recommenfrom p. 18 dations could actions at this site fulfill?

Step 4 What are key considerations for integrating restoration actions with other drivers? What ongoing engagement will be needed at this site?



QUESTION 2: How to identify priority areas for restoration of particular habitat types?

One of the key questions for ecosystem restoration in the Delta is where to prioritize restoration of certain habitat types to maximize their likely value and viability. Guidance in *A Delta Renewed* can be used to help identify potential priority areas for restoring particular habitat types. The approach presented here might be appropriate for planners trying to achieve agency targets and restoration practitioners trying to achieve acreage targets. Our suggested approach to using *A Delta Renewed* to answer this type of question uses a 4-step process:



STEP 1: Identify process-based strategies

Habitat restoration guidance in *A Delta Renewed* is linked to process-based strategies. The habitat types in the table below represent habitat types historically present in the Delta and their modern analogues, as well as novel habitat types not seen historically (see pages 18-19 of A Delta Transformed for a description of habitat types).

Use the table below to identify which process-based strategies support your habitat type of interest.

HABITATS		n	narsl	n	open water					woody riparian					terrestrial transition							other land uses			
	HISTORICAL HABITAT NOVEL HABITAT NOVEL HABITAT PROCESS-BASED STRATEGIES	tidal freshwater emergent wetland	non-tidal freshwater emergent wetlands	managed wetlands	tidal channels	fluvial channels	freshwater pond or lake	native SAV/FAV	non-native SAV/FAV	flooded islands	valley foothill riparian	willow riparian scrub or shrub	willow thicket	managed floodplain	willow scrub on artificial levees	wet meadow or seasonal wetland	vernal pool complex	alkali seasonal wetland complex	stabilized interior dune vegetation	grassland	oak woodland or savanna	annual grassland	wildlife-friendly agriculture	green infrastructure	flood bypasses
	Re-establish tidal marsh processes in areas at intertidal elevations	х			х			х																	
	Re-establish marsh processes in subsided areas	х		х	х			х	x	Х															
	Re-establish tidal zone processes in channels and flooded islands				х			х	x	Х															
	Re-establish connections between streams and tidal floodplains	х	х	х	х	х	Х			Х	х	х	Х		Х										
	Re-establish fluvial processes along streams		х	х		х	x				х	x	x	x	х										Х
	Re-establish tidal-terrestrial transition zone processes	х	х	х												х	х	Х	Х	х	х	х			
	Re-establish connected terrestrial habitats around the Delta periphery															x	Х	Х	Х	x	х	х			
	Expand wildlife-friendly agriculture																						х		
	Integrate ecological functions into urban areas																							Х	

be appropriate. Use the space	see A Delta Renewed for guidance on where these strategies might be below to note important considerations, reflections, or additional where this strategy might be appropriate.	see Delta Renewed for where strategies are
	PROCESS-BASED STRATEGIES FROM DELTA RENEWED	appropriate
	Re-establish tidal marsh processes in areas at intertidal elevations	pg. 45
	Re-establish marsh processes in subsided areas	pg. 49
	Re-establish tidal zone processes in channels and flooded islands	pg. 53
	Re-establish connections between streams and tidal floodplains	pg. 57
	Re-establish fluvial processes along streams	pg. 61
	Re-establish tidal-terrestrial transition zone processes	pg. 67
	Re-establish connected terrestrial habitats around the periphery of the Delta	pg. 71
	Expand wildlife-friendly agriculture	pg. 75
	Integrate ecological functions into urban areas	pg. 79
₭ RESPONSE:		

STOP and SUMMARIZE: Using the summary sheet on page 36, record which process-based restoration strategies are important for creating the desired habitat type and what kinds of areas these strategies are appropriate in.

STEP 2: Consider important processes

Restoring habitat by restoring processes is a key tenet of the Delta Landscapes approach (Guiding Principle 3). This approach focuses on how hydrogeomorphic processes formed and maintained dynamic landscape patterns, supporting the ecological processes that maintain wildlife population and community dynamics. The table below identifies key physical process guidelines for each strategy, and landscape configuration and scale guidelines for the associated habitat types.

Use the table below to identify the pages in *A Delta Renewed* where physical process and landscape configuration guidance is provided for the process-based strategie(s) relevant to your habitat type of interest.

PROCESS-BASED STRATEGIES	"Guidelines" for physical processes and landscape configuration
Re-establish tidal marsh processes in areas at intertidal elevations	pgs. 46-47
Re-establish marsh processes in subsided areas	pgs. 50-51
Re-establish tidal zone processes in channels and flooded islands	pgs. 54-55
Re-establish connections between streams and tidal floodplains	pgs. 58-59
Re-establish fluvial processes along streams	pgs. 62-65
Re-establish tidal-terrestrial transition zone processes	pgs. 68-69
Re-establish connected terrestrial habitats around the Delta periphery	pgs. 72-73
Expand wildlife-friendly agriculture	pgs. 76-77
Integrate ecological functions into urban areas	pgs. 80-81

	support the habitat type of interest.
*	RESPONSE:

In the space below, record any notes on how key processes might be either enhanced, restored, or emulated to

STOP and SUMMARIZE: Using the summary sheet on page 36, describe some of the important physical processes tor sustaining the desired habitat type. Also record any ideas you have for enhancing, restoring, or emulating these processes in the Delta.

STEP 3: Consider landscape configuration

In this step, consider how habitat restoration can achieve certain landscape configurations (e.g., the scale of restoration, connectivity among projects, diversity of habitat types) that support ecological resilience. A Delta Renewed provides a set of "Guiding Principles" that address important considerations for achieving ecological resilience at a landscape scale. The guiding principles that relate to landscape configuration are listed on the following pages. Use the prompts in the following pages to consider how these concepts apply to habitat restoration and conservation for a particular habitat type.

Step 2 points to more detailed guidance from *A Delta Renewed* for each process-based strategy. The table below points to additional guidance by habitat type from *A Delta Transformed*.

Additional information for understanding <i>landscape configuration and scale</i> is provided by landscape change analysis in <i>A Delta Transformed</i> .	see Delta Transformed
For freshwater emergent wetland	pg. 50-55
For riparian forest or scrub	pg. 64-67
For tidal-terrestrial transition zone	pg. 72-73
For floodplains	pg. 38-41
For channels and flooded islands	pg. 30-33

	Restore appropriate <i>landscape connectivity</i> .	DELTA RENEWED
*	RESPONSE: How do landscape connectivity considerations influence which areas should be restored (e.g., which areas fill a critical gap in connectivity for a particular habitat type? Which areas are near potential source populations? Which areas would re-establish connections among habitat types in a way that mimics historical configurations?)	see Guiding Principle #4 pg. 22
	Restore landscapes with a focus on <i>complexity and diversity</i> .	DELTA RENEWED
	RESPONSE: How can habitats be restored in a way that maintains habitats across important gradients and contributes to within habitat type diversity? (e.g., salinity and tidal gradients; North, Central, South Delta, as appropriate)	see Guiding Principle #5 pg. 23

Q WHERE DO I RESTORE THIS HABITAT TYPE?

STEP 1: Identify Process-Based Strategies STEP 2: Consider Important Processes STEP 3: Consider Landscape Configuration STEP 4: Integrate with Other Drivers

DELTA RENEWED Create *redundancy* of key landscape elements, populations, and habitat types. ☀ RESPONSE: How can habitat types be restored in a way that provides key redundancy in terms of habitat patches or populations? **DELTA RENEWED** Restore at large scales. * RESPONSE: Where are there opportunities for large habitat patches? Will planned actions achieve restoration of this habitat type at a desirable scale?

Restore with a *long time horizon* in mind.

ı	RESPONSE: How will this habitat type to evolve over time (especially in light of climate change and sealevel rise)? Are there areas that are appropriate for restoration now that will not be feasible in the future, or vise versa?	see Guiding Principle #7 pg. 25
,		
,		
,		

STOP and SUMMARIZE: Using the summary sheet on page 36, record takeaway considerations concerning the configuration and scale of the desired habitat type. Also note any areas that emerge as high-priority in light of these considerations.

DELTA RENEWED

STEP 4: Integrate with other drivers

In this step consider how ecological recommendations from *A Delta Renewed* interface and integrate with other land uses—now and into the future—and how this might affect the considerations in Steps 1-3. Consider also the ongoing engagement that would be needed or desired on site, including adaptive and ongoing management.

see Guiding Principle #1 pgs. 18-19

In the Delta, considerations related to people, institutions, and infrastructure are described in more detail under *Guiding Principle 1: Appreciate that people are part of the Delta*.

These considerations include:

- Integrating ecological, social, and economic resilience
- Supporting wildlife in developed and agricultural lands
- · Coordinating policy and planning
- Implementing adaptive management
- Recognizing the need for ongoing management
- Taking advantage of infrastructure upgrades
- · Prioritizing multi-benefits projects
- Convening stakeholder meetings
- Planning at the landscape scale

NOTE: While these are very important considerations, they are only briefly discussed in *A Delta Renewed*. Additional tools, efforts, and resources are needed to better address these concerns.

*	RESPONSE: Are there social or economic concerns that would change how ideas from Steps 1-3 might be implemented or prioritized? Do management and policy considerations affect which recommendations from Steps 1-3 should be prioritized, or how they might be implemented? Are there critical knowledge gaps about this site that need to be addressed? Are there opportunities to better integrate benefits for both people and nature (e.g., working lands, co-benefits of restoration)? Note applicable recommendations and considerations here:				
	(e.g., working lands, co-benefits of restoration)? Note applicable recommendations and considerations nere:				

STOP and SUMMARIZE Using the summary sheet on page 36, record how considerations about integrating with other landuses in the Delta might change how recommendations from Steps 1-3 might be implemented or prioritized.



North Delta. Photograph by Amy Richey (SFEI-ASC).

SUMMARY SHEET

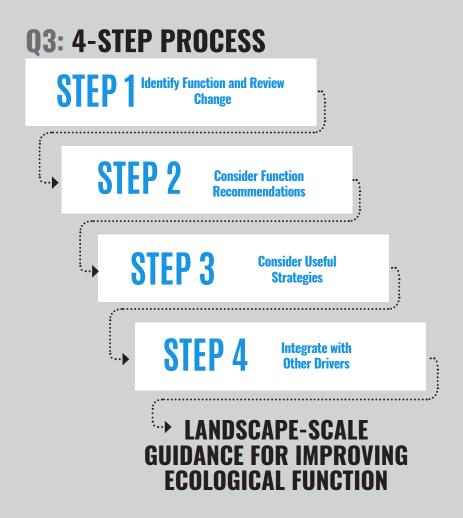
QUESTION #2: How do I identify priority areas where a particular habitat should be restored?

Step 1 Which process-based strategies are important for creating the desired habifrom p. 26 tat type? In what kinds of areas are these strategies appropriate? Step 2 What are some of the important physical processes for sustaining the desired from p. 28 habitat type? How might these processes be enhanced, restored, or emulated? Step 3 What are important considerations concerning the configuration and scale from p. 32 of the desired habitat type? Do any areas emerge as high-priority in light of these considerations? Step 4 What are important considerations for integrating the ideas that emerge from p. 34 from Steps #1-3 with other land uses and for ongoing management or engagement?



QUESTION 3: How to maximize support for a particular ecological function across the Delta (or subregion)?

The Delta Landscapes approach is structured around the idea that understanding how ecological functions were supported historically, and how that support has changed over time, will help us better understand how they can be supported in the future. This question can be used to consider how a particular function, for example, support of anadromous fish in the Delta, might best be supported.



STEP 1: Identify function and review change

Understanding how the Delta supported ecological functions historically, and how that support has changed over time, is a central element in the process-based Delta Landscapes approach.

The *Delta Landscapes* project focuses on seven primary ecological functions provided by the historical Delta, assesses how these functions have been altered over time, and makes recommendations for supporting these functions into the future. For the ecological function of interest, review how this function was supported in the historical Delta and how landscape change has affected support for the ecological function by reading relevant pages from the A *Delta Transformed* and *A Delta Renewed* reports.

Use the table below to identify key background information on landscape change related to each function from both A Delta Renewed and A Delta Transformed.

FUNCTIONS FROM DELTA TRANSFORMED & DELTA RENEWED	see Delta Renewed for introduction to function	see Delta Transformed for how function has changed over time
Provides habitat and connectivity for fish	pg. 84	pgs. 34-37
Provides habitat and connectivity for marsh wildlife	pg. 88	pgs. 48-49
Provides habitat and connectivity for riparian wildlife	pg. 92	pgs. 62-63
Provides habitat and connectivity for waterbirds	pg. 96	pgs. 58-59
Provides habitat and connectivity for edge wildlife (including marsh-terrestrial transition zone wildlife)	pg. 100	pgs. 68-70
supports primary productivity	pg. 104	
supports biodiversity	pg. 106	

₩ RE	SPONSE: Use this space to record any important takeaways, insights, or considerations on historical support for this
	nction, or change in support for this function over time.
Tu	nction, or change in support for this function over time.
_	

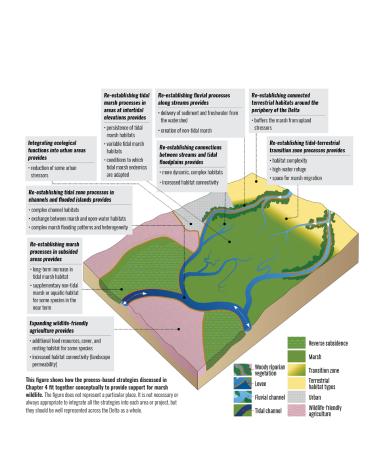
STOP and SUMMARIZE: Using the summary sheet on page 48, record your function of interest, the Delta Landscapes function it relates to, and any key items from the notes above.



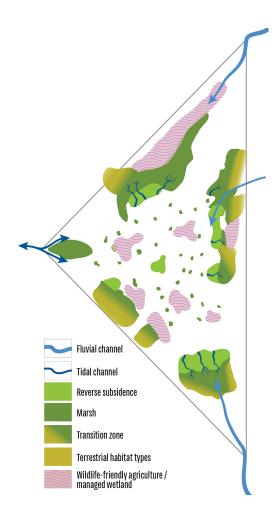
STEP 2: Consider function recommendations

A Delta Renewed provides guidance for supporting the ecological functions identified in Step 1. This guidance includes a list recommendations for supporting each function at a landscape scale.

In addition, this guidance includes a figure explaining how different process-based strategies work together to support each function at a landscape scale (an example for supporting marsh wildlife is shown below, on the left). This guidance also includes a conceptual map showing a potential landscape configuration that would support that ecological function (an example for supporting marsh wildlife is shown below, on the right).



EXAMPLE: HOW STRATEGIES FIT TOGETHER TO SUPPORT MARSH WILDLIFE



EXAMPLE: POTENTIAL LANDSCAPE CONFIGURATION TO SUPPORT MARSH WILDLIFE

Use the table below to find the recommendations and figures for the ecological function of interest, then use the space below to record any important takeaways, insights, or considerations.

FUNCTIONS FROM DELTA TRANSFORMED & DELTA RENEWED	Recommendations in Delta Renewed
Provides habitat and connectivity for fish	pg. 85-87
Provides habitat and connectivity for marsh wildlife	pg. 89-91
Provides habitat and connectivity for riparian wildlife	pg. 93-95
Provides habitat and connectivity for waterbirds	pg. 97-99
Provides habitat and connectivity for edge wildlife	pg. 101-103

* RESPONSE:	

STOP and SUMMARIZE: Using the summary sheet on page 48, record any ideas you have for how you might achieve the relevant recommendations.

STEP 3: Consider useful strategies

Restoring habitat by restoring process is a key tenet of the Delta Landscapes approach. Use the recommendations from Step 2 to identify which process-based restoration strategies might be useful for improving the chosen ecological function.

Once you have determined the most important strategies for improving the ecological function in question, use the table below to learn about these individual strategies:

- **a. Familiarize yourself with the strategies.** Read about any of the important strategies you are unfamiliar with. The introductory sections to each strategy in *A Delta Renewed* are a good place to do this.
- **b.** Explore where the individual strategies makes sense. For each strategy, there is a "landscape consideration" map that illustrates key factors for determining where the strategy may or may not be appropriate.
- c. Explore guidelines for the configuration of individual strategies. For each strategy there are a series of "physical process guidelines" and "landscape configuration & scale guidelines" that offer guidance for how the strategies should be implemented (e.g., how large and how far apart should marshes be?).

PROCESS-BASED STRATEGIES	a. Introductory section to each strategy	b. "Landscape maps" to help know where strategies make sense	c. "Guidelines" for physical processes and landscape configuration	
Re-establish tidal marsh processes in areas at intertidal elevations	pg. 44	pg. 45	pgs. 46-47	
Re-establish marsh processes in subsided areas	pg. 48	pg. 49	pgs. 50-51	
Re-establish tidal zone processes in channels and flooded islands	pg. 52	pg. 53	pgs. 54-55	
Re-establish connections between streams and tidal floodplains	pg. 56	pg. 57	pgs. 58-59	
Re-establish fluvial processes along streams	pg. 60	pg. 61	pgs. 62-65	REFERENCES
Re-establish tidal-terrestrial transition zone processes	pg. 66	pg. 67	pgs. 68-69	S
Re-establish connected terrestrial habitats around the Delta periphery	pg. 70	pg. 71	pgs. 72-73	
Expand wildlife-friendly agriculture	pg. 74	pg. 75	pgs. 76-77	
Integrate ecological functions into urban areas	pg. 78	pg. 79	pgs. 80-81	

* RESPONSE: What are important strategies for improving you function? With respect to this function, what see be the most relevant guidelines concerning physical processes and landscape configuration?			

STOP and SUMMARIZE: Using the summary sheet on page 48, describe how strategies fit together to support your function and any aspects of the potential landscape configuration map you would like to highlight, build upon, or modify.

STEP 4: Integrate with other drivers

In this step consider how ecological recommendations from *A Delta Renewed* interface and integrate with other land uses—now and into the future—and how this might affect the considerations in Steps 1-3. Consider also the ongoing engagement that would be needed or desired on site, including adaptive and ongoing management.

see Guiding Principle #1 pgs. 18-19

In the Delta, considerations related to people, institutions, and infrastructure are described in more detail under *Guiding Principle 1: Appreciate that people are part of the Delta*.

These considerations include:

- Integrating ecological, social, and economic resilience
- Supporting wildlife in developed and agricultural lands
- · Coordinating policy and planning
- Implementing adaptive management
- Recognizing the need for ongoing management
- Taking advantage of infrastructure upgrades
- · Prioritizing multi-benefits projects
- Convening stakeholder meetings
- Planning at the landscape scale

NOTE: While these are very important considerations, they are only briefly discussed in *A Delta Renewed*. Additional tools, efforts, and resources are needed to better address these concerns.

** RESPONSE: Are there social or economic concerns that would change how ideas from Steps 1-3 might be implemented or prioritized? Do management and policy considerations affect which recommendations from Steps 1-3 should be prioritized, or how they might be implemented? Are there critical knowledge gaps about this site that need to be addressed? Are there opportunities to better integrate benefits for both people and nature (e.g., working lands, co-benefits of restoration)? Note applicable recommendations and considerations here:

STOP and SUMMARIZE Using the summary sheet on page 48, record how considerations about integrating with other landuses in the Delta might change how recommendations from Steps 1-3 might be implemented or prioritized.



SUMMARY SHEET

QUESTION #3: How do I improve a particular ecological function across the Delta (or Delta subregion)?

Step 1 Record your function of interest and note which of functions discussed in A

from p. 40 Delta Renewed report it relates to. Then summarize high-level lessons about how the Delta historically supported the ecological function in question and how that has changed.

Step 2 For the function in question what are some ideas for achieving the relevant recommendations?

Step 3 What are important strategies for improving your function? With respect to this function, what seem to be the most relevant guidelines concerning physical processes and landscape configuration?

Step 4 What are key considerations for integrating ideas with other land uses and for ongoing management or engagement?

References

San Francisco Estuary Institute-Aquatic Science Center (SFEI-ASC). 2016. A Delta Renewed: A Guide to Science-Based Ecological Restoration in the Sacramento-San Joaquin Delta. Prepared for the California Department of Fish and Wildlife and Ecosystem Restoration Program. A Report of SFEI-ASC's Resilient Landscapes Program, Publication #799, San Francisco Estuary Institute-Aquatic Science Center, Richmond, CA.

San Francisco Estuary Institute-Aquatic Science Center (SFEI-ASC). 2014. *A Delta Transformed: Ecological Functions, Spatial Metrics, and Landscape Change in the Sacramento-San Joaquin Delta.*Prepared for the California Department of Fish and Wildlife and Ecosystem Restoration Program.
A Report of SFEI-ASC's Resilient Landscapes Program, Publication #729, San Francisco Estuary Institute-Aquatic Science Center, Richmond, CA.

Whipple A, Grossinger RM, Rankin D, Stanford B, Askevold, R. 2012. *Sacramento-San Joaquin Delta Historical Ecology Investigation: Exploring Pattern and Process*. San Francisco Estuary Institute-Aquatic Science Center, Richmond, CA.

The Delta Landscapes project produced three reports that speak to the past, present, and potential future Delta. The final report, A Delta Renewed, provides a framework for how individual projects planned in the near-term can contribute to a coherent, long-term vision of improving ecosystem function across the Delta. A Delta Renewed User Guide aims to increase the accessibility of the technical findings in A Delta Renewed for easier application to restoration and conservation efforts across the Delta. The User Guide was written for a broad audience, including restoration practitioners, landowners, and local, state and federal agencies. The guide provides a step-by-step path through A Delta Renewed, walking a user through how to apply the findings of the report.

