

Figure 1. Location of joint TDSP/LEWA 376 acre restoration project, called “Tolowa Dunes” in USFWS *Phacelia argentea* proposed listing. The contiguous span of the Lake Earl Wildlife Area (LEWA) with Tolowa Dunes State Park (TDSP) is more than 10,000 acres. The half acre blue LEWA lots are in failed “Pacific Shores subdivision.”

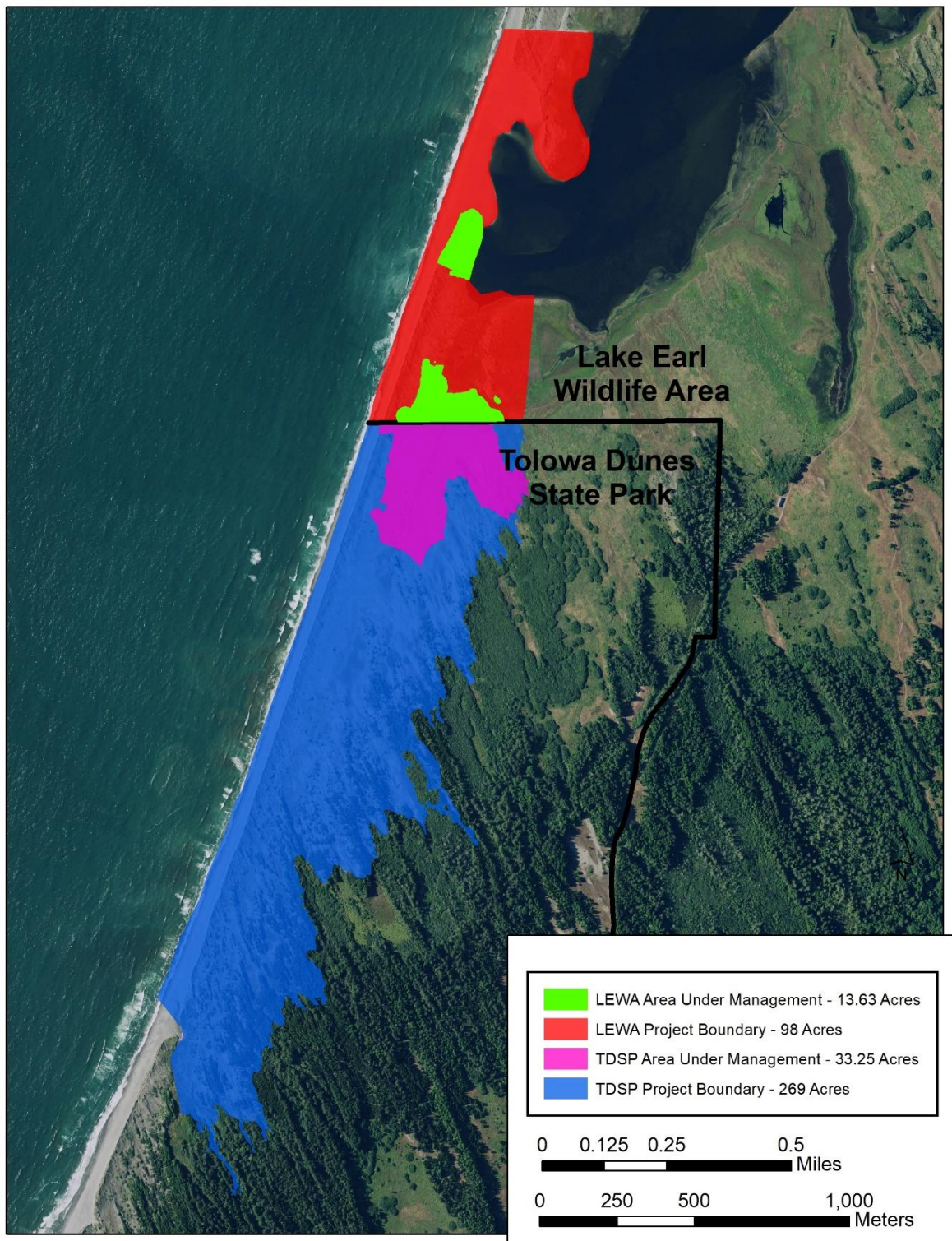


Figure 2. Currently 47 acres (and expanding in 2022) are under management within joint TDSP/LEWA restoration project boundary, called "Tolowa Dunes" in USFWS proposed listing. We suggest all 376 acres should be mapped as Critical Habitat/Unit 11 for *Phacelia argentea*.



Figure 3. Unique location of LEWA restoration project boundary. It sits at the mouth of the lagoon, at the interface of the ocean, coastal dunes, coastal prairie, open sandspit and rare estuarine and freshwater wetlands. The roads shown just to the north are in the failed Pacific Shores subdivision where the proposed critical habitat/ Unit 10 is located.

Special Status Plant Species 2020

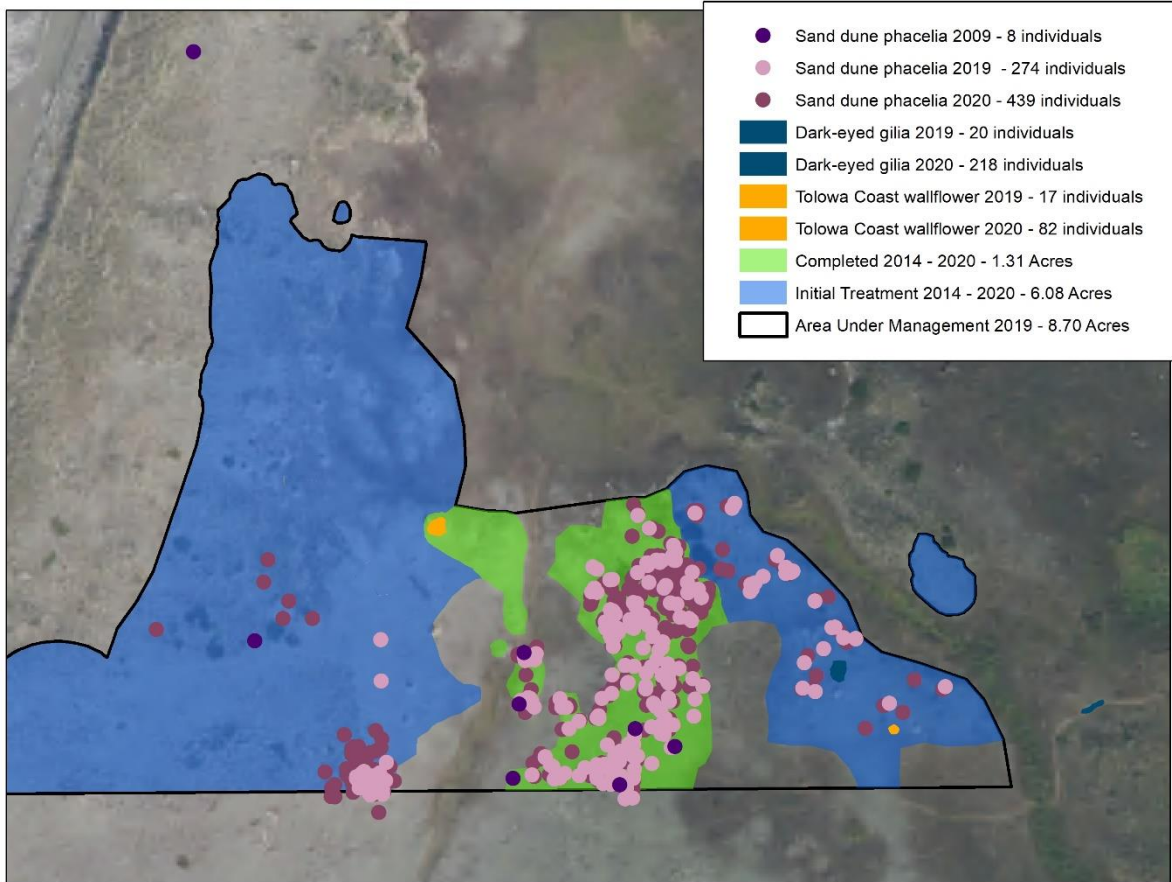


Figure 4. Map showing location and increase of special status plant species in restoration area between 2009 and 2020. Immediate and explosive response to *Ammophila* removal indicates a healthy seedbed in the sand.

Sand dune phacelia 2021

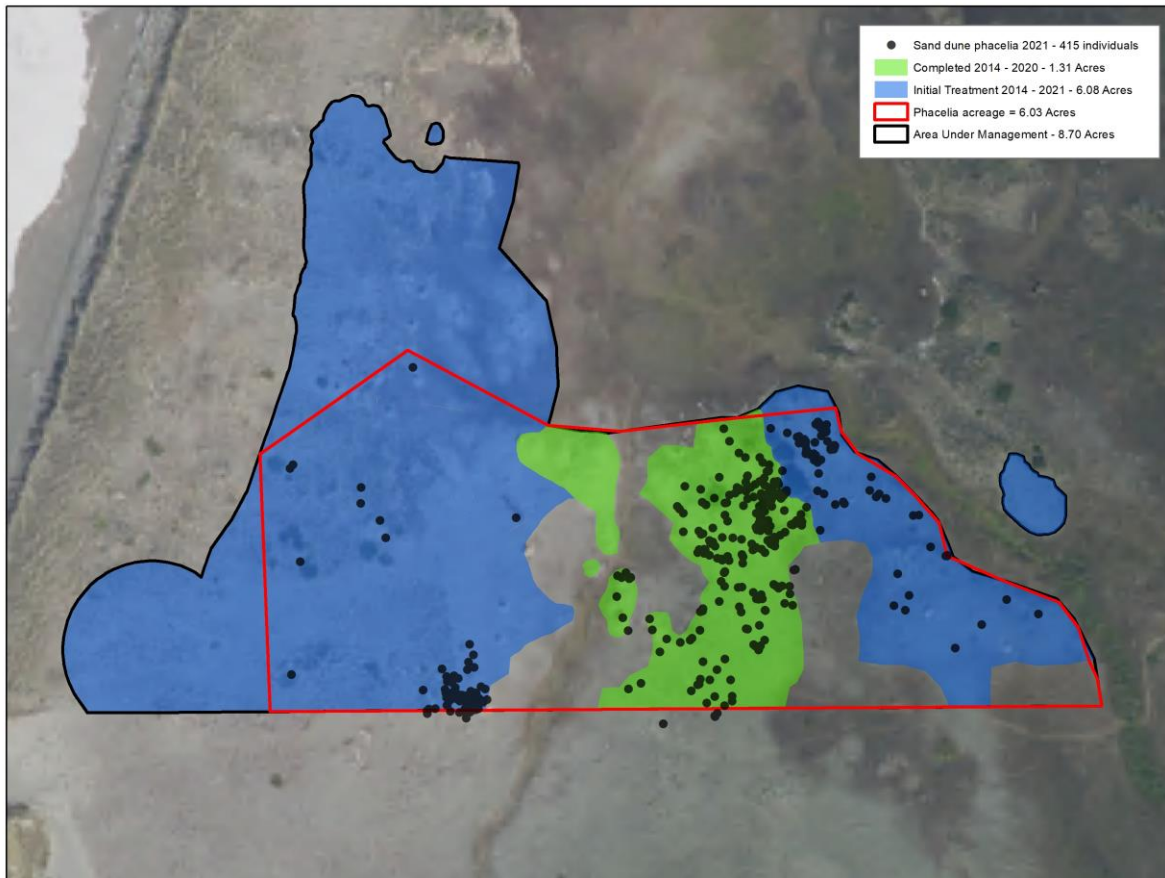


Figure 5. At the southern extent of the LEWA restoration project and where *Ammophila* has been removed to date, the red line indicates roughly 6.03 acres where phacelia response/emergence has been concentrated thus far. However, phacelia also occurs to the northwest and northeast where *Ammophila* has not yet been removed and thus not all the phacelia has been mapped, and of course to the far north in proposed Unit 10/Pacific Shores.

Table 1. Special status bird species known to occur within the LEWA restoration project area at Lake Tolowa. Federally Threatened (**FT**); State of California Threatened (**ST**) or Endangered (**SE**); USFWS Bird of Conservation Concern (**BCC**); California Bird Species of Special Concern (**BSSC**).

Common Name	Scientific Name	Federal Status	State Status	Status at LEWA
Brant	<i>Branta bernicla</i>		BSSC	Migrant
Redhead	<i>Aythya americana</i>		BSSC	Migrant
Barrows Goldeneye	<i>Bucephala islandica</i>		BSSC	Migrant
Western Grebe	<i>Aechmophorus occidentalis</i>	BCC		Breeding
Vaux's Swift	<i>Chaetura vauxi</i>		BSSC	Breeds nearby
Black Oystercatcher	<i>Haematopus bachmani</i>	BCC		Breeds nearby
Western Snowy Plover	<i>Charadrius alexandrinus nivosus</i>	FT	BSSC	Breeding and wintering
Whimbrel	<i>Numenius phaeopus</i>	BCC		Migrant
Long-billed Curlew	<i>Numenius americanus</i>	BCC		Migrant
Marbled Godwit	<i>Limosa fedoa</i>	BCC		Migrant
Red Knot	<i>Calidris canutus</i>	BCC		Migrant
Short-billed Dowitcher	<i>Limnodromus griseus</i>	BCC		Migrant
Solitary Sandpiper	<i>Tringa solitaria</i>	BCC		Migrant
Lesser Yellowlegs	<i>Tringa flavipes</i>	BCC		Migrant
Caspian Tern	<i>Hydroprogne caspia</i>	BCC		Migrant
Black Tern	<i>Chlidonias niger</i>		BSSC	Rare migrant
Arctic Tern	<i>Sterna paradisaea</i>	BCC		Rare migrant
Common Loon	<i>Gavia immer</i>		BSSC	Migrant
Pelagic Cormorant	<i>Phalacrocorax pelagicus</i>	BCC		Breeds nearby
American White Pelican	<i>Pelecanus erythrorhynchos</i>		BSSC	Migrant
Northern Harrier	<i>Circus hudsonius</i>		BSSC	Breeding
Bald Eagle	<i>Haliaeetus leucocephalus</i>		SE	Breeds nearby
Swainson's Hawk	<i>Buteo swainsoni</i>		ST	Rare migrant
Burrowing Owl	<i>Athene cunicularia</i>		BSSC	Migrant
Short-eared Owl	<i>Asio flammeus</i>		BSSC	Migrant
American Peregrine Falcon	<i>Falco peregrinus anatum</i>	BCC		Breeds nearby
Horned Lark	<i>Eremophila alpestris (strigata)*</i>	BCC		Migrant
Purple Martin	<i>Progne subis</i>		BSSC	Breeding
Oregon Vesper Sparrow	<i>Poocetes gramineus affinis</i>	BCC, ESA Proposed	BSSC	Migrant, recently extirpated breeder
Tricolored Blackbird	<i>Agelaius tricolor</i>		ST	Rare migrant
Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>		BSSC	Migrant

Yellow Warbler	<i>Setophaga petechia</i>		BSSC	Breeding
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Table 2. Special Status Plant Species in the LEWA/TDSP joint restoration area.

Species Name	Federal Status	State Status
Sea-watch <i>Angelica lucida</i>	None	Special Status Species CNPS 4.2
Johnny nip <i>Castilleja ambigua ssp. ambigua</i>	None	Special Status Species CNPS 4.2
Tolowa Coast wallflower <i>Erysimum concinnum</i>	None	Special Status Species CNPS: List 1B.2
Dark-eyed gilia <i>Gilia millefoliata</i>	None	Special Status Species CNPS: List 1B.2
American glehnia <i>Glehnia littoralis ssp. leiocarpa</i>	None	Special Status Species CNPS 4.2
Sand-dune phacelia <i>Phacelia argentea</i>	Federal Candidate	Special Status Species CNPS: List 1B.1

California Native Plant Society (CNPS) Listing Categories:

1B.1: Plants rare, threatened, or endangered in California and elsewhere

1B.2: Plants rare, threatened, or endangered in California but more common elsewhere

4.2: Plants are of limited distribution in California, fairly endangered in California



Figure 6. Aerial of LEWA restoration area (red) estimated. Note restored area north and south of the LEWA/TDSP border. *Ammophila* north of the red polygon was buried by heavy equipment.



Figure 7. Aerial of larger LEWA restoration boundary. Area to the north and starting just above the red rectangle is the failed Pacific Shores subdivision, where proposed critical habitat Unit 10 is located.



Figure 8. *Ammophila* on backside of foredune adjacent to delineated wetlands. Lake is tidal.



Figure 9. *Ammophila* on smaller dune/island within delineated wetlands. Lake is tidal.



Figure 10. Sequence showing reestablished native vegetation after *Ammophila* removal. A) Before B) May 2019 C) Sept. 2019 D) July 2020



Figure 11. Tolowa Dune Stewards working with Del Norte County's Youth Training Academy and Sierra Service Project youth and families to remove *Ammophila* in the project area.



Figure 12. LEWA restored dune habitat with Sierra Service Project volunteers in the background.



Figure 13. Western snowy plover in the project area.



Figure 14. Restored dune habitat displaying native dune mat species beach buckwheat, beach primrose, beach morning glory and seaside daisy.



Figure 15. Restored dune habitat with mats of the federal candidate species sand dune phacelia (silvery looking) and yellow sand verbena. Shown with State Parks employee for scale. Lake Tolowa and Oregon mountains in background distance.



Figure 16. Tolowa Coast wallflower (*Erysimum concinnum*). Vorobik (2014) suggested the Lake Tolowa population should be separated as a unique species. *Anticipating that this is likely to occur, the Stewards have begun using the common name “Tolowa Coast” wallflower to honor the Tolowa Dee-ni’.



Figure 17. Our youngest volunteer posing with a large mat of sand dune phacelia (*Phacelia argentea*). Green flags in background mark additional plants.



Figure 18. Dark-eyed gilia, (*Gilia millefoliata*).



Figure 19. Native bee on sand dune phacelia (*Phacelia argentea*).



Figure 20. The iconic Roosevelt elk browsing on native plants on a restored dune in LEWA/TDSP project area, where they spend ~May through September. Lake Tolowa is in the background.

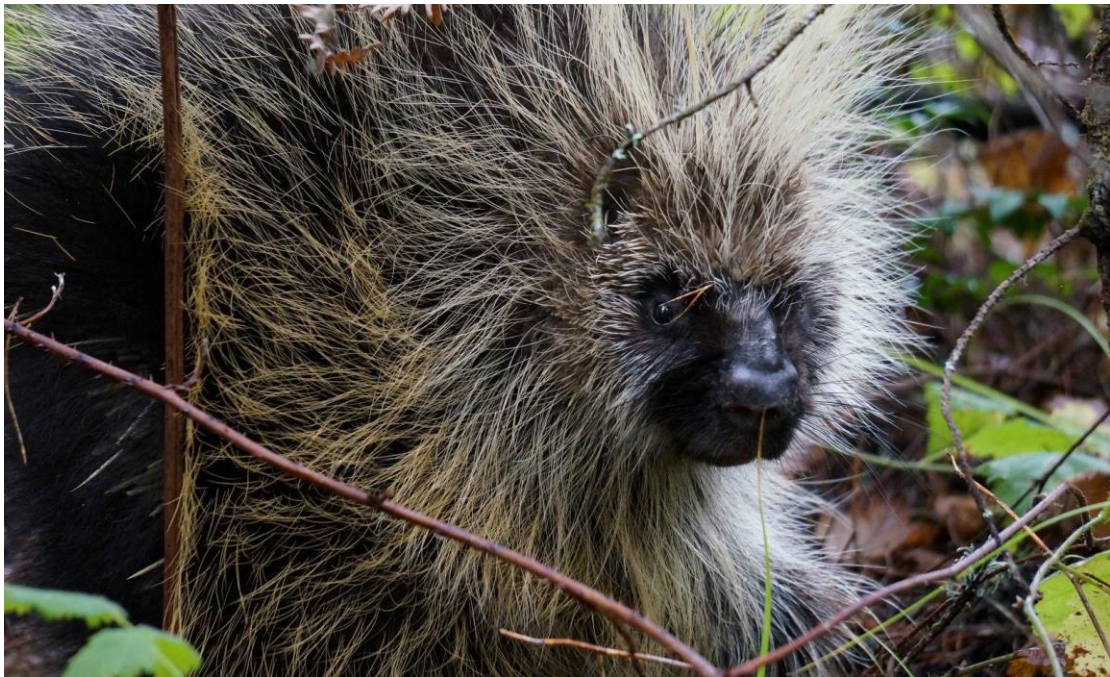


Figure 21. Porcupine have been observed foraging on native dune plant beach knotweed.



Figure 22. River otter on the gently sloped shoreline in the project area.



Figure 23. Steep foredune from *Ammophila* stabilization in the project area on TDSP.



Figure 24. California Conservation Corps working on LEWA/TDSP border to manually remove *Ammophila* from foredune, in what we now call the “test gap.”



Figure 25. The foredune “test gap” returning to a more natural elevation, after manually removing *Ammophila* on TDSP.



Figure 26. A large, older mat of sand dune phacelia (*Phacelia argentea*), thriving on a nebka created by sand movement inland from the “test gap” in the foredune.



Figure 27. This photo was taken adjacent to the foredune “test gap” shown in Figure 26 from a landscape view. Note the more robust plants further in the background and closer to the ocean.



Figure 28. Landscape view showing where *Ammophila* was buried using heavy equipment in October, 2020. The red arrow denotes the approximate southern boundary of the *Ammophila* heavy equipment removal for comparison. The large patch of tules in the immediate foreground provides a reference point for the removal on the foredune in the background.



Figure 29. Dramatic changes after *Ammophila* hand removal and heavy equipment burial.
Top: 2 Sept 2020, prior to heavy equipment. Middle: 1 Nov 2020, immediately after heavy equipment burial. Bottom: 15 July 2021, note lowered foredune and thriving native plant mats.



Figure 30. Sierra Service Project volunteers celebrating a successful day of *Ammophila* removal.



Figure 31. Tolowa Dee-ni' Language class members working as volunteers, those in front exhibiting the long *Ammophila* root that won the day's longest root prize.

