

# **Tomales Bay Watershed Species of Local Interest**

## **Native and Non-native Species of Conservation or Management Concern**



Thomas Gardali<sup>1</sup>, John P. Kelly<sup>2</sup>, and Jules Evens<sup>3</sup>

<sup>1</sup>PRBO Conservation Science, 3820 Cypress Drive #11, Petaluma, CA 94954

<sup>2</sup>Cypress Grove Research Center, Audubon Canyon Ranch, P.O. Box 808, Marshall, CA 94940

<sup>3</sup>Avocet Research Associates, P.O. Box 839, Point Reyes Station, CA 94956

In collaboration with Tomales Bay Watershed Council Habitat Committee members:  
Sarah Allen, Ken Fox, Daniel George, Patricia Hickey, Joe Kinyon, Michael Mery, and  
Nancy Scolari

A Report of the Tomales Bay Watershed Council

Box 447, Point Reyes Station, CA 94956

[www.tomalesbaywatershed.org](http://www.tomalesbaywatershed.org)

December 2011

## **ACKNOWLEDGMENTS**

The following Tomales Bay Watershed Council members helped in various ways to promote and push this project forward: Neysa King, Liza Crosse, Carlos Porrata, and Michael Mery.

The following people (with areas of emphasis) reviewed some or all of the criteria scores and provided important comments needed to nominate appropriate taxa as Species of Local Interest: Peter Baye (plants), Ben Becker (invertebrates), Shelly Benson (lichens, etc.), Paola Bouley (fish), Tom Carlberg (lichens, etc.), Andrew Cohen (invertebrates), Gary Fellers (herpetofauna), Ingrid Hogle (aquatic plants), Loran May (plants), Lorraine Parsons (invasive plants), Amelia Ryan (invasive plants), Carrie Sendak (fish), Doreen Smith (plants), and Rich Stallcup (vertebrates). Additional review of the draft report and list was provided by members of the Tomales Bay Watershed Council Habitat Committee.

Cover photo from PRBO Conservation Science files.

### **Suggested Citation**

Gardali, T., J. P. Kelly, J. Evens. 2011. Tomales Bay Watershed Species of Local Interest: native and non-native species of conservation or management concern. A Report of the Tomales Bay Watershed Council, Box 447, Point Reyes Station, CA 94956.

# Tomales Bay Watershed Species of Local Interest

## Native and Non-native Species of Conservation or Management Concern

### SUMMARY

The Species of Local Interest list for the Tomales Bay watershed is created and managed by the Tomales Bay Watershed Council ([www.tomalesbaywatershed.org](http://www.tomalesbaywatershed.org)). The list provides a means for prioritizing and promoting efforts to protect and restore native species and habitat areas, through restoration, management, ecological monitoring, and guided research. The list is divided into two parts: Species of Local Concern and Local Ecological Pest Species. The species in each list are ranked to highlight “Priority” and “High Priority” Species of Local Interest, based on several scoring criteria, published papers, unpublished reports, and expert opinion. Species of Local Concern include 203 taxa, of which 119 are Priority species and 27 are High Priority species. Local Ecological Pest Species include 168 taxa, of which 50 are Priority pests and 55 are High Priority pests. Habitat associations indicate the general importance of wetlands to Priority and High Priority Species of Local Interest. Additional species may be nominated for scoring and potential inclusion as Species of Local Interest.

### INTRODUCTION

The Tomales Bay Watershed Stewardship Plan, developed in 2003 by the Tomales Bay Watershed Council (TBWC), outlined a framework for watershed stewardship intended to guide future programs and projects and to assist funding organizations in ascertaining conservation needs at the watershed scale. The framework contained a series of goals, associated objectives, and an action plan needed for achieving the goals.

One of the three stewardship goals in the Stewardship Plan (Goal B) is to “Restore and preserve the integrity of natural habitats and native communities” in the Tomales Bay watershed. The general objectives established to meet this goal and guide appropriate stewardship actions in the watershed are:

1. Restore and protect populations of native species.
2. Control invasive non-native species.
3. Restore and protect habitats of native species.
4. Restore and protect hydrologic integrity.

The Action Plan presented to meet this goal (Action 3.0) included the development of a list of “species of local interest” (SOLI) and indicated that this list might include native and non-native species, state and federally listed species, and species that are “indicators

of ecosystem health.” The SOLI list identifies species and habitats of special conservation value or management concern, but it does not specifically consider indicators of overall ecosystem health. This is because the objectives of species of local management concern are different than those of ecological indicators. The former seeks to protect and enhance species of local concern and associated habitats while the latter aims to measure ecosystem integrity or restoration success. However, some SOLI species are recognized as having “major ecological importance,” (see listing criteria below) and hence provide insight into the structure or function of a local ecosystem, or the abundance or stability of a community or species.

The purpose of the SOLI list is to provide a means for prioritizing activities for the protection and restoration of particular native species and habitat complexes in the watershed, including the management and control of invasive pest species. We suspect the list will be used by researchers, policy makers, conservation planners and practitioners including government and non-government organizations. Specifically, the SOLI list will help to promote and facilitate the creation of monitoring, research, and management activities, and to substantiate or inform associated proposals for funding. The TBWC identified the development of the list of species of local interest as a high priority in the Watershed Stewardship Plan.

The Habitat Committee of the TBWC was tasked with developing the Tomales Bay Watershed Species of Local Interest (SOLI) list. This Committee met frequently, discussed the best approach for developing such a list, and determined (1) the definition and potential use of the list, (2) a process for nominating taxa, (3) criteria for scoring nominees, and (4) a ranking scheme to select priority species of local interest. We present the resulting SOLI list in this report, emphasizing that this is a dynamic list to be managed by the TBWC. This list is subject to ongoing revision as we improve our understanding of the local status of species in the Tomales Bay Watershed.

## METHODS

### Definition of SOLI

We defined Species of Local Interest as native or non-native taxa considered to have special importance in the conservation or management of the Tomales Bay Watershed (Figure 1). Species may qualify for inclusion on the SOLI list only if they occur in the watershed in a primary role, as year-round, breeding-season, or winter-season residents; transient species are excluded.



Figure 1. The Tomales Bay Watershed drains 255 square miles of western Marin County, California. Bisected by the San Andreas Fault, the major watercourses that feed Tomales Bay include: Lagunitas Creek (and its major tributaries) which drains the north flank of Mount Tamalpais and Bolinas Ridge to the south; Tomasini Creek and Walker Creek which drain the coast range on the east shore, and numerous smaller watercourses along the western slope that drain Inverness Ridge.

Cultivated or pet species that are not feral in the watershed are also excluded from the SOLI list; such species are considered “domesticated” and already receive attention and management. Ecological pest species not currently present, or not confirmed to be present, are included if they pose a significant ecological threat to the watershed.

The purpose of the SOLI list, as stated above and in the Tomales Bay Watershed Stewardship Plan, includes the protection and restoration of particular native species and habitats and, in addition, the management and control of invasive pest species. Therefore, we identified two related goals for the SOLI list: (1) the protection, enhancement, and restoration of populations of native species in the watershed, based on key characteristics related to their ecology or conservation value, and (2) the elimination, reduction, or control of threats by native and non-native pest species on the biodiversity and/or natural ecosystem processes in the watershed. These goals differ substantially with regard to the appropriate criteria needed for scoring and ranking nominated taxa. For example, a declining trend in abundance may prioritize activities needed to protect a native species, whereas an increasing trend in abundance may signal priorities needed to control an ecological pest species. Therefore, we divided the SOLI list into the following two lists.

**Species of Local Concern:** native taxa that warrant special research, monitoring, management, or habitat enhancement

**Local Ecological Pest Species:** native and non-native ecological pest species that threaten native plant and animal communities or are likely to result in significantly negative socio-economic impacts.

## Nominations

Nominations were initiated by including species in the watershed that are listed as State- or Federally threatened or endangered, or listed as worthy of special conservation status or management concern by one or more key agencies or organizations (Appendix 1). Additional taxa were nominated by Jules Evens, based on his knowledge of the watershed. The resulting, preliminary list was then circulated to several local experts for nomination of additional species (see Acknowledgments above).

Ultimately, 205 taxa (11 lichens and bryophytes, 78 higher plants, 20 invertebrates; 14 fishes; 8 herpetofauna; 51 birds; 23 mammals) were nominated for scoring as Species of Local Concern and 165 taxa (1 alga, 64 higher plants, 65 invertebrates; 15 fishes; 3 herpetofauna; 7 birds; 10 mammals) were nominated for scoring as Local Ecological Pest Species. We compiled general habitat associations for each species, based on the classification of habitat types used by Calflora ([www.calflora.org](http://www.calflora.org)), to allow for assessments of the relative importance of habitat types to Species of Local Interest (Appendix 2). Other information compiled for each species included seasonal status, technical references, and personal contacts. Additional species may be nominated, on request to the TBWC, for scoring and potential inclusion as SOLI.

Table 1. Criteria used for scoring Species of Local Interest in the Tomales Bay watershed. Each criterion is scored as either “1” (yes, meets the described criterion) or “0” (no, does not meet the criterion or status is unknown). See text for criteria used to nominate species for scoring

---

### Species of Local Concern

1. **Major Ecological Importance.** The species is likely to have a major role in protecting or enhancing the structure or function of a local ecosystem and / or the abundance or stability of another SOLI. Decline or loss has resulted in or would have deleterious consequences for a local ecosystem or for another SOLI.
2. **Locally Rare or Declining.** The species resides seasonally or year-round in the watershed and is rare or is undergoing a non-cyclical decline in abundance.
3. **Iconic.** The species is charismatic to local cultural perspectives and its current status is likely to draw broad attention or concern. The species is emblematic of a local habitat or region, is widely-recognized by the public, and/or its name refers to a locality within the watershed.
4. **Socio-economic Significance.** A native species that has demonstrable positive influence on human culture or livelihoods. Species of special importance to indigenous cultures are included here.
5. **Habitat Significance and Endemism.** The species’ preferred habitat within the watershed is an important component of its endemic distribution, or its habitat association provides an important contribution to the biological diversity of the watershed.

### Local Ecological Pest Species

1. **Presence in the Watershed.** Some ecological pest species were nominated without confirmation of their presence in the watershed. However, because the ecological pests (1) can be difficult to detect and (2) may invade from surrounding areas, they may represent an ecological threat even if not known to be present in the watershed. Therefore, presence in the watershed is a contributing but inconclusive factor in evaluating threats associated with ecological pests.
  2. **Status.** The species is identified as a high priority pest for eradication or management on a selected list by a reference agency or organization (Appendix 1).
  3. **Major Ecological Threat.** The species is likely to have a major role in degrading the structure or function of a local ecosystem or reducing the abundance of a Species of Local Concern.
  4. **Locally Abundant or Increasing.** The species resides seasonally or year-round in the watershed and is common or increasing rapidly in abundance.
  5. **Socio-economic Significance.** The species has demonstrable negative influence on human culture or livelihoods. Species of special importance to indigenous cultures are included here.
-

### **Scoring Criteria**

All nominated species were scored for priority ranking, using standard criteria, as Species of Local Concern or Local Ecological Pest Species. We established two sets of scoring criteria, one for each of the SOLI lists (Table 1). Jules Evens generated preliminary scores for nominated taxa. For each species, each criterion is scored as either “1” (yes, meets the described criterion) or “0” (no, does not meet the criterion). Seasonally resident taxa are scored only for the season in which they are of special interest.

Draft scores for all nominated species were circulated to a larger group of appropriate experts for review (see Acknowledgments above). Following expert review, we adjusted the scores, as needed, to improve confidence in the adjusted scores, using existing data or primary references on habitat affinities, seasonal status, status on other concern lists, or other available information. The final scores reflect an attempt to represent the best available information, based on published papers, unpublished reports, and expert opinion. However, because of the frequent lack of precise data, especially for more cryptic species, many scores rely heavily on expert opinion.

### **Prioritization**

All nominated taxa are considered to be Species of Local Interest. To identify species that should be given stewardship priority, we classified the relative importance of each nominated species, based on the sum of scores across all scoring criteria, for either Species of Local Concern or Local Ecological Pest Species. The sum of scores provides an ordinal value for classifying relative importance, from 0 to 5, with higher scores indicating greater concern. We then assigned two levels of priority to each SOLI list. “Priority” species are those with summed scores of 2 or 3, and “High Priority” species are those with summed scores of 4 or 5; all remaining species are considered to be of local interest but are not currently prioritized.

## **RESULTS and DISCUSSION**

### **Species of Local Interest**

We identified 371 species as Species of Local Interest. Of these, 205 are of Species of Local Concern (Appendix 3) and 166 are Local Ecological Pest Species (Appendix 4). Within the combined SOLI list (Species of Local Concern and Local Ecological Pest Species), we classified 168 species as Priority species, including 9 (5%) lichens or bryophytes, 68 (41%) higher plants, 22 (13%) invertebrates, 17 (10%) fishes, 5 (3%) herpetofauna, 29 (7%) birds, and 18 (11%) mammals (Figure 1). We classified 84 SOLI species as High Priority, including 47 (55%) higher plants, 8 (9%) invertebrates, 11 (13%) fishes, 3 (4%) herpetofauna, 11 (13%) birds, and 4 (5%) mammals (Figure 2). The relative importance of higher plants and birds among Priority and High Priority SOLI reflects the predominance of these two groups among Species of Local Concern and the importance of higher plants among Local Ecological Pest Species (see below).



The combined habitat affiliations of Priority and High Priority species indicate the predominant importance of wetland habitat types across the combined lists of Species of Local Interest (Figure 3). Thus, stewardship actions in wetland habitats are likely to target the greatest number of SOLI, leading to both the protection of Species of Local Concern and the reduction of threats imposed by Local Ecological Pest Species.

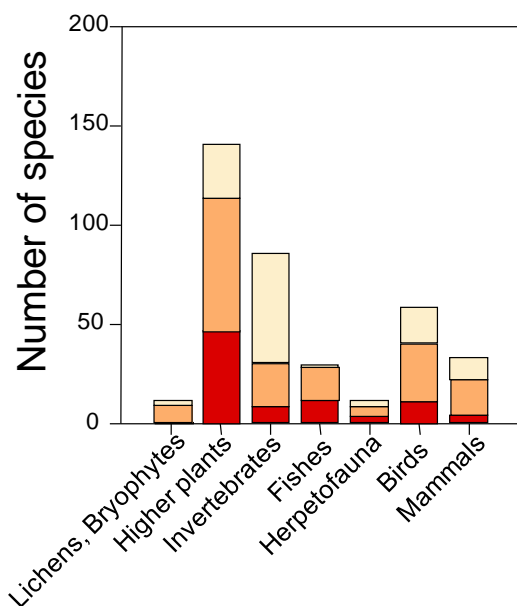


Figure 2. General taxonomic distribution of Species of Local Interest in the Tomales Bay watershed (Species of Local Concern and Local Ecological Pest Species combined). Stacked bars indicate High Priority species (red bars), Priority species (orange bars), and unprioritized species (beige bars).

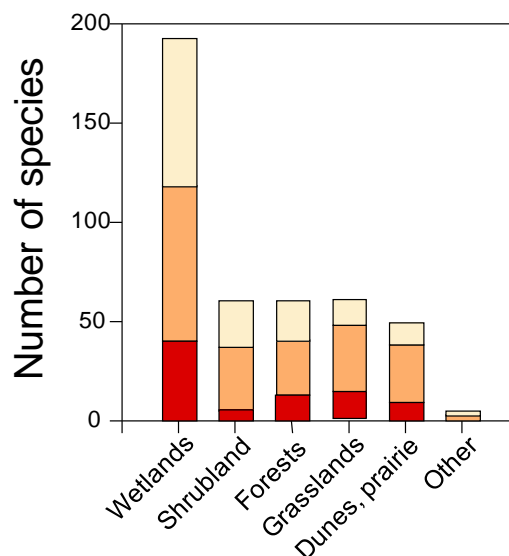


Figure 3. Distribution among general habitat types of Species of Local Interest in the Tomales Bay watershed (Species of Local Concern and Local Ecological Pest Species combined). Stacked bars indicate High Priority species (red bars), Priority species (orange bars) and unprioritized species (beige bars). See Appendix 2 for habitat groupings.

### Prioritized List of Species of Local Concern

Of 205 Species of Local Concern, we classified 120 species as Priority species and 28 species as High Priority species (Appendix 3). Among Priority species, 9 (8%) are lichens or bryophytes, 45 (38%) higher plants, 16 (13%) invertebrates, 9 (8%) fishes, 3 (3%) herpetofauna, 27 (23%) birds, and 11 (9%) mammals. High Priority Species of Local Concern include 8 (29%) higher plants, 2 (7%) invertebrates, 5 (18%) fishes, 2 (7%) herpetofauna, 8 (29%) birds, and 3 (11%) mammals (Figure 4). The predominance of higher plants and birds among Priority and High Priority Species of Local Concern reflects their importance in the watershed. However, the results may underestimate the importance of other taxonomic groups because ecological information needed to qualify as Priority or High Priority species is often not available.

Priority and High Priority Species of Local Concern are most commonly associated with wetlands, followed by forests, shrublands, and dunes/coastal prairie habitat areas (Figure 5). The higher overall importance of wetlands reflects the particular value of these areas to birds (32% of Priority and High Priority wetland species), followed by higher plants (18%), fishes (18%), and Invertebrates (15%; Appendix 3).



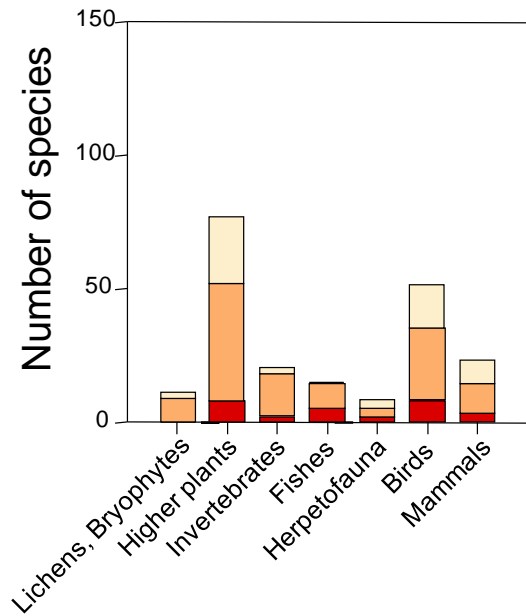


Figure 4. General taxonomic distribution of Tomales Bay Species of Local Concern. Stacked bars indicate high Priority species (red bars), Priority species (orange bars), and unprioritized species (beige bars).

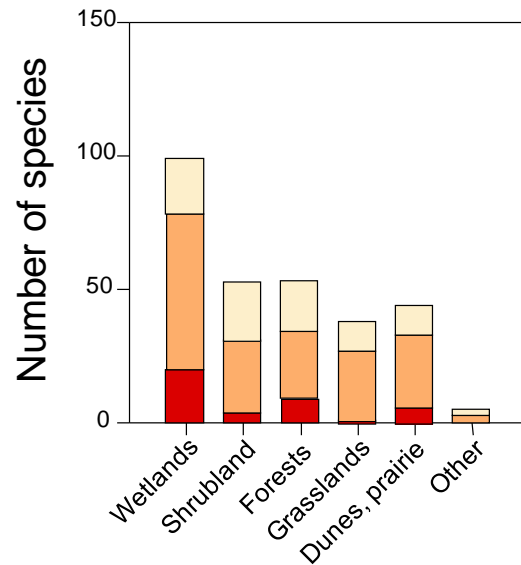


Figure 5. Distribution among general habitat types of Species of Local Concern in the Tomales Bay watershed. Stacked bars indicate High Priority species (red bars), Priority species (orange bars), and unprioritized species (beige bars). See Appendix 2 for habitat groupings.

### Prioritized List of Local Ecological Pest Species

Of 166 Local Ecological Pest Species, we classified 48 species as Priority species and 57 species as High Priority species in the SOLI (Appendix 4). Among the Priority pest species, 23 (48%) were higher plants, 6 (13%) invertebrates, 8 (17%) fishes, 2 (4%) herpetofauna, 2 (4%) birds, and 7 (15%) mammals. High Priority pest species included 39 (68%) higher plants, 6 (11%) invertebrates, 6 (11%) fishes, 1 (2%) herpetofauna, 3 (5%) birds, and 1 (2%) mammals (Figure 6). A relatively large number of invertebrates were included as Local Ecological Pest Species but did not qualify as Priority pests as many of these require additional information to determine their status and associated threats to the Tomales Bay watershed (Figure 6).

Priority and High Priority Local Ecological Pest Species are most common in wetland and grassland habitats (Figure 7). Among Priority and High Priority Pest Species associated with wetlands, 35% are fishes, 30% higher plants and 25% were invertebrates. In grassland habitats, ecological threats by local pest species are primarily imposed by higher plants, which account for 90% of the Priority and High Priority Pest Species in grasslands.

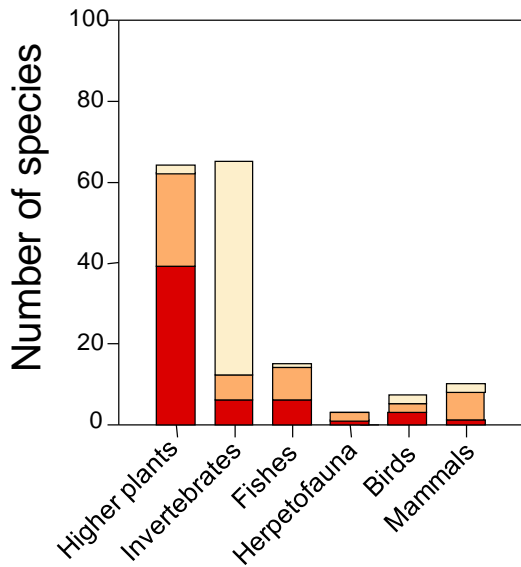


Figure 6. General taxonomic distribution of Local Ecological Pest Species in the Tomales Bay watershed. Stacked bars indicate High Priority species (red bars), Priority species (orange bars), and unprioritized species (beige bars).

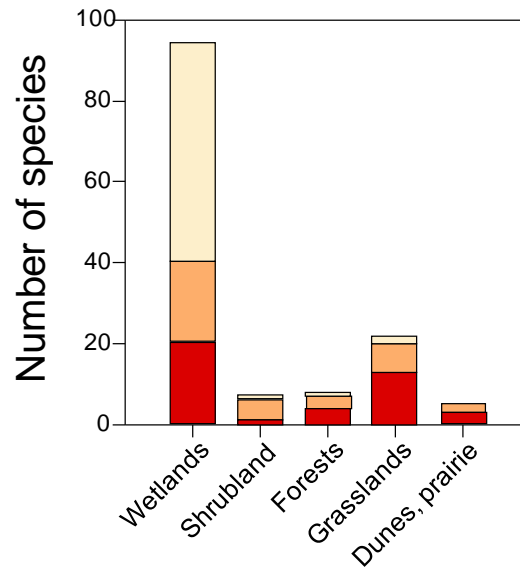


Figure 7. Distribution among general habitat types of Local Ecological Pest Species in the Tomales Bay watershed. Stacked bars indicate High Priority species (red bars), Priority species (orange bars), and unprioritized species (beige bars). See Appendix 2 for habitat groupings.

### Locally Extirpated

We identified 11 native species that have been extirpated from the watershed: 3 invertebrates, 4 birds, 1 mammal, and 3 plants (Table 2). Two non-native species have also been extirpated: wild pig (*Sus scrofa*) and axis deer (*Axis axis*).

Table 2. Species known to be extirpated from the Tomales Bay watershed, Marin County, California.

| Common name               | Scientific name                         |
|---------------------------|---|
| Mission Blue Butterfly    | <i>Icaricia icarioides missionensis</i> |
| American Apollo Butterfly | <i>Parnassius clodius</i>               |
| Greenish Blue Butterfly   | <i>Plebius saepiolus</i>                |
| California Condor         | <i>Gymnogyps californianus</i>          |
| Flightless Scoter         | <i>Chendytes lawi</i>                   |
| Marbled Murrelet          | <i>Brachyramphus marmoratus</i>         |
| Greater Roadrunner        | <i>Geococcyx californicus</i>           |
| Grizzly Bear              | <i>Ursus arctos horribilis</i>          |
| Tidestrom's lupine        | <i>Lupinus tidestromii</i>              |
| Marin checkerbloom        | <i>Sidalcea hickmanii viridis</i>       |
| American glehnia          | <i>Glehnia littoralis leiocarpa</i>     |

**Climate Change**

There is mounting evidence that plants and animals are responding to changes in climate in a variety of ways, including changes in phenology, geographical distributions, and population declines. Some predictions suggest that climate change poses significant threats to global biodiversity.

We considered including a climate change threats criterion but judged it to be too speculative after testing it for all species of local concern. At present, too little is known about the effects of climate change on most taxa and especially those whose life histories are not well known. Hence, inclusion of a climate change threats criteria would be highly incomplete and inaccurate, likely biasing our final lists.

We believe however that it is essential to consider the effects of climate change on the Watersheds plants and animals and recommend a formal climate change vulnerability assessment be conducted. A vulnerability assessment avoids the pitfalls of only considering the potential threats of climate change and instead considers a species' sensitivity and likely exposure to climate change.

Wetlands may be especially vulnerable to climate change given the predictions for sea level rise and changes hydrology. Hence, because the highest percentage of SOLI are wetland species, we recommend this habitat be raised in priority for research aimed at making climate change conservation and management recommendations.

**Appendix 1.** Special status lists and associated status codes used to identify Species of Local Interest in the Tomales Bay Watershed.

| <b>Special status lists</b>   | <b>Code</b> |
|---|-------------|
| American Bird Conservancy - U. S. Watch List of Birds of Conservation Concern | ABC_WLBCC   |
| American Fisheries Society - Endangered                                       | AFS_EN      |
| American Fisheries Society - Threatened                                       | AFS_TH      |
| American Fisheries Society - Vulnerable                                       | AFS_VU      |
| Bureau of Land Management - Sensitive   | BLM_S       |
| California Dept. of Forestry & Fire Protection - Sensitive                    | CDF_S       |
| California Dept. of Fish & Game - Fully Protected                             | DFG_FP      |
| California Dept. of Fish & Game - Species of Special Concern                  | DFG_SSC     |
| California Dept. of Fish & Game - Watch List                                  | DFG_WL      |
| California Endangered Species Act – Endangered                                | SE          |
| California Endangered Species Act – Threatened                                | ST          |
| California Endangered Species Act – Rare                                      | SR          |
| Calif. Invasive Plant Council Invasive Plant Inventory Database– Limited      | IPC-limited |
| Calif. Invasive Plant Council Invasive Plant Inventory Database– Moderate     | IPC-mod     |
| Calif. Invasive Plant Council Invasive Plant Inventory Database – High        | IPC-high    |
| California Native Plant Society   | 4           |
| California Native Plant Society   | 3           |
| California Native Plant Society   | 2           |
| California Native Plant Society   | 1B.1        |
| California Native Plant Society   | 1B.2        |
| California Native Plant Society   | 1B.3        |
| California Native Plant Society   | 1A          |
| California Native Plant Society   | CE          |
| Endangered Species Act – Endangered   | FE          |
| Endangered Species Act – Threatened   | FT          |
| IUCN - Conservation Dependent   | IUCN_CD     |
| IUCN - Critically Endangered  | IUCN_CR     |
| IUCN - Data Deficient   | IUCN_DD     |
| IUCN - Endangered   | IUCN_EN     |
| IUCN - Least Concern  | IUCN_LC     |
| IUCN - Near Threatened I  | UCN_NT      |
| IUCN - Vulnerable   | IUCN_VU     |
| Marine Mammal Commission - Species of Special Concern                         | MMC_SSC     |
| National Marine Fisheries Service - Species of Concern                        | NMFS_SC     |
| Point Reyes National Seashore Invasive Species Management List (draft)        | PORE        |
| U. S. Forest Service - Sensitive  | USFS_S      |
| U. S. Fish & Wildlife Service Birds of Conservation Concern                   | USFWS_BCC   |
| USFWS "Federal species of concern"  | FSC         |
| Western Bat Working Group - High Priority                                     | WBWG_H      |
| Western Bat Working Group - Low-Medium Priority                               | WBWG_LM     |
| Western Bat Working Group - Medium Priority                                   | WBWG_M      |
| Western Bat Working Group - Medium-High Priority                              | WBWG_MH     |
| Xerces Society - Critically Imperiled   | XERCES_CI   |
| Xerces Society - Data Deficient   | XERCES_DD   |
| Xerces Society - Imperiled  | XERCES_IM   |
| Xerces Society - Vulnerable   | XERCES_VU   |

**Appendix 2.** General habitat groupings used to summarize the distribution of species across habitat associations. Associated habitat types (codes) follow the primary plant community classification used by Calflora ([www.calflora.org](http://www.calflora.org); 1700 Shattuck Av #198, Berkeley, CA 94709).

Wetlands: FW,ST,IT,SEW,FEW,W-R, E-M  
 Forests: CRF, CCPF, NCCF (includes DF), MEF, COW  
 Shrublands: NCS, CH, SAS, SHS  
 Dune & prairie: CD, CP, CS  
 Grassland: VG-P  
 Other: mammal dung, rocky outcrop, ruderal, etc.

| Habitat type                           | Code   |
|--|--------|
| Closed-cone pine forest                | CCPF   |
| Coastal strand/Coastal dunes           | CS, CD |
| Chaparral                              | CH     |
| Coastal Redwood forest                 | CRF    |
| Saline Emergent Wetland (=tidal marsh) | SEW    |
| Coastal prairie                        | CP     |
| Coastal sage scrub                     | CSS    |
| Douglas-fir forest                     | DF     |
| Estuarine-Marine                       | E-M    |
| Freshwater                             | FW     |
| Fresh Emergent wetlands                | FEW    |
| Valley grassland & pasture             | VG-P   |
| Mixed Evergreen Forest                 | MEF    |
| Northern coastal scrub                 | NCS    |
| Northern Coastal Coniferous Forest     | NCCF   |
| Redwood Forest                         | RF     |
| Sagebrush scrub                        | SAS    |
| Shadescale Scrub                       | SHS    |
| Coastal Oak woodland                   | COW    |
| Wetland-riparian                       | W-R    |
| Intertidal                             | IT     |
| Subtidal                               | ST     |
| Urban                                  | URB    |
| Human structures*                      | HS     |
| Ruderal*                               | R      |

\*additional habitat types not from Calflora

**Appendix 3.** Species of Local Concern in the Tomales Bay watershed. Criterion scores (0 = no, 1 = yes; Table 1) for Major ecological importance (E), Locally rare or declining (R), Iconic (I), Socio-economic significance (S), and Habitat significance (H), and rankings for High Priority (HP) and Priority (P) species are indicated.

| Common name                        | Scientific name                                       | E | R | I | S | H | Priority |
|------------------------------------|---|---|---|---|---|---|----------|
| Western Snowy Plover               | <i>Charadrius alexandrinus nivosus</i>                | 1 | 1 | 1 | 1 | 1 | HP       |
| Pacific Herring                    | <i>Clupea pallasii</i>                                | 1 | 1 | 1 | 1 | 1 | HP       |
| California Black Rail              | <i>Laterallus jamaicensis coturniculus</i>            | 1 | 1 | 1 | 1 | 1 | HP       |
| Coho Salmon (c. Cal. coast ESU)    | <i>Oncorhynchus kisutch</i>                           | 1 | 1 | 1 | 1 | 1 | HP       |
| Steelhead (c. Cal coast ESU)       | <i>Oncorhynchus mykiss irideus</i>                    | 1 | 1 | 1 | 1 | 1 | HP       |
| Coast Redwood                      | <i>Sequoia sempervirens</i>                           | 1 | 1 | 1 | 1 | 1 | HP       |
| Northern Spotted Owl               | <i>Strix occidentalis caurina</i>                     | 1 | 1 | 1 | 1 | 1 | HP       |
| California Freshwater Shrimp       | <i>Syncaris pacifica</i>                              | 1 | 1 | 1 | 1 | 1 | HP       |
| Pacific Pond Turtle                | <i>Actinemys marmorata (marmorata)</i>                | 1 | 1 | 1 | 0 | 1 | HP       |
| Point Reyes Mountain beaver        | <i>Aplodontia rufa phaea</i>                          | 1 | 1 | 1 | 0 | 1 | HP       |
| Great Blue Heron                   | <i>Ardea Herodias</i>                                 | 1 | 1 | 1 | 0 | 1 | HP       |
| Brant                              | <i>Branta bernicla</i>                                | 1 | 0 | 1 | 1 | 1 | HP       |
| Point Reyes ceanothus              | <i>Ceanothus gloriosus gloriosus</i>                  | 1 | 1 | 1 | 0 | 1 | HP       |
| Mt. Tamalpais thistle              | <i>Cirsium hydrophlumvar. Vaseyi</i>                  | 1 | 1 | 1 | 0 | 1 | HP       |
| Point Reyes Bird's Beak            | <i>Cordylanthus (Chloropyron) maritimus palustris</i> | 1 | 1 | 1 | 0 | 1 | HP       |
| Yellow larkspur                    | <i>Delphinium luteum</i>                              | 1 | 1 | 1 | 0 | 1 | HP       |
| Yellow Warbler                     | <i>Dendroica petechia brewsteri</i>                   | 1 | 1 | 1 | 0 | 1 | HP       |
| Tidewater goby                     | <i>Eucyclogobius newberryi</i>                        | 1 | 1 | 1 | 0 | 1 | HP       |
| Tidestrom's lupine                 | <i>Lupinus tidestromii</i>                            | 1 | 1 | 1 | 0 | 1 | HP       |
| Chinook salmon (c. Cal. Coast ESU) | <i>Oncorhynchus tshawytscha</i>                       | 1 | 1 | 1 | 1 | 0 | HP       |
| Osprey                             | <i>Pandion haliaetus</i>                              | 1 | 0 | 1 | 1 | 1 | HP       |
| Harbor Seal                        | <i>Phoca vitulina</i>                                 | 1 | 0 | 1 | 1 | 1 | HP       |
| Mountain lion                      | <i>Puma concolor</i>                                  | 1 | 1 | 1 | 0 | 1 | HP       |
| Mt. Tamalpais live-oak             | <i>Quercus parvular. tamalpaisensis</i>               | 1 | 1 | 1 | 0 | 1 | HP       |
| California Clapper Rail            | <i>Rallus longirostris obsoletus</i>                  | 1 | 1 | 1 | 0 | 1 | HP       |
| California Red-legged Frog         | <i>Rana draytonii</i>                                 | 1 | 1 | 1 | 0 | 1 | HP       |
| Myrtle's Silverspot Butterfly      | <i>Speyeria zerene myrtleae</i>                       | 1 | 1 | 1 | 0 | 1 | HP       |
| Pacific Eelgrass                   | <i>Zostera marina (latifolia)</i>                     | 1 | 0 | 1 | 1 | 1 | HP       |
| Pink sand verbena                  | <i>Abronia umbellata breviflora</i>                   | 1 | 1 | 0 | 0 | 1 | P        |
| Green Sturgeon                     | <i>Acipenser medirostris</i>                          | 1 | 1 | 0 | 1 | 0 | P        |
| Tricolored Blackbird               | <i>Agelaius tricolor</i>                              | 1 | 1 | 0 | 0 | 1 | P        |
| Point Reyes (California) bentgrass | <i>Agrostis densiflora (puntareyensis)?</i>           | 0 | 1 | 1 | 0 | 1 | P        |
| Grasshopper Sparrow                | <i>Ammodramus savannarum</i>                          | 1 | 1 | 0 | 0 | 1 | P        |
| Golden Eagle                       | <i>Aquila chrysaetos</i>                              | 1 | 1 | 1 | 0 | 0 | P        |
| Mt. Tamalpais manzanita            | <i>Arctostaphylos hookeri ssp. montana</i>            | 0 | 1 | 1 | 0 | 1 | P        |
| Bolinas manzanita                  | <i>Arctostaphylos virgata</i>                         | 1 | 0 | 1 | 0 | 1 | P        |
| Great Egret                        | <i>Ardea alba</i>                                     | 1 | 0 | 1 | 0 | 1 | P        |
| Burrowing Owl                      | <i>Athene cunicularia</i>                             | 1 | 1 | 1 | 0 | 0 | P        |
| Poin Reyes blennosperma            | <i>Blennosperma nanum var. robustum</i>               | 1 | 0 | 1 | 0 | 1 | P        |
| Coastal Bryoria                    | <i>Bryoria pseudocapillaris</i>                       | 1 | 1 | 0 | 0 | 1 | P        |
| Tomales isopod                     | <i>Caecidotea tomalensis</i>                          | 0 | 1 | 1 | 0 | 1 | P        |
| Bay Ghost Shrimp                   | <i>Callinassa californiensis</i>                      | 1 | 1 | 0 | 1 | 0 | P        |
| Dungeness Crab                     | <i>Cancer magister</i>                                | 1 | 0 | 1 | 1 | 0 | P        |

| Common name                          | Scientific name                                 | E R I S H | Priority |
|--------------------------------------|---|-----------|----------|
| Humboldt Bay owl's clover            | <i>Castilleja ambigua humboldtensis</i>         | 1 1 0 0 1 | P        |
| Northern Harrier                     | <i>Circus cyaneus</i>                           | 1 1 1 0 0 | P        |
| Francisco thistle                    | <i>Cirsium andrewsii</i>                        | 1 1 0 0 1 | P        |
| Townsend's Big-eared Bat             | <i>Corynorhinus townsendii</i>                  | 1 1 0 0 1 | P        |
| Yellow Rail                          | <i>Coturnicops noveboracensis</i>               | 0 1 1 0 1 | P        |
| Baker's larkspur                     | <i>Delphinium bakeri</i>                        | 0 1 1 0 1 | P        |
| California Giant Salamander          | <i>Dicamptodon ensatus</i>                      | 1 0 1 0 1 | P        |
| "Tomales dunes" Smooth scouring rush | <i>Equisetum laevigatum? aff. Ferrisii</i>      | 1 0 1 0 1 | P        |
| Gray Whale                           | <i>Eschrichtius robustus</i>                    | 1 0 1 1 0 | P        |
| "Saltmarsh" Common Yellowthroat      | <i>Geothlypis trichas sinuosa</i>               | 1 1 0 0 1 | P        |
| Foliose "spotted owl" lichen         | <i>Heterodermia leucomelos</i>                  | 1 1 0 0 1 | P        |
| Coast iris                           | <i>Iris longipetala</i>                         | 0 1 1 0 1 | P        |
| San Francisco Forktail Damselfly     | <i>Ischnura gemina</i>                          | 1 1 0 0 1 | P        |
| Tomales Roach                        | <i>Lavinia symmetricus ssp. 2</i>               | 1 1 0 0 1 | P        |
| Point Reyes meadowfoam               | <i>Limnanthus douglasii ssp sulphurea</i>       | 0 1 1 0 1 | P        |
| River Otter                          | <i>Lutra canadensis Sonora</i>                  | 1 0 1 0 1 | P        |
| Bat ray                              | <i>Myliobatis californica</i>                   | 1 0 1 0 1 | P        |
| Black-crowned Night-Heron            | <i>Nycticorax nycticorax</i>                    | 1 0 1 0 1 | P        |
| Olympia oyster                       | <i>Ostrea lurida</i>                            | 0 1 1 0 1 | P        |
| California halibut                   | <i>Paralichthys californicus</i>                | 1 0 0 1 1 | P        |
| "Marin" Chestnut-backed Chickadee    | <i>Parus rufescens neglectus</i>                | 0 1 1 0 1 | P        |
| California Brown Pelican             | <i>Pelecanus occidentalis californicus</i>      | 1 1 1 0 0 | P        |
| Double-crested Cormorant             | <i>Phalacrocorax auritus</i>                    | 1 0 1 0 1 | P        |
| "Point Reyes" blue butterfly         | <i>Plebejus icarioides parapheres</i>           | 0 1 1 0 1 | P        |
| Purple Martin                        | <i>Progne subis</i>                             | 0 1 1 0 1 | P        |
| Pacific Littleneck                   | <i>Protothaca staminea</i>                      | 1 1 0 1 0 | P        |
| Foothill Yellow-legged Frog          | <i>Rana boylei</i>                              | 1 1 0 0 1 | P        |
| Mt. Tamalpais jewelflower            | <i>Streptanthus glandulosus spp. pulchellus</i> | 0 1 1 0 1 | P        |
| American Badger                      | <i>Taxidea taxus</i>                            | 1 1 1 0 0 | P        |
| Woven-spore lichen                   | <i>Texasporium sancti-jacobi</i>                | 1 1 0 0 1 | P        |
| Eulachon (smelt)                     | <i>Thaleichthys pacificus</i>                   | 1 1 0 1 0 | P        |
| Blue Mud Shrimp                      | <i>Upogebia pugettensis</i>                     | 1 1 0 1 0 | P        |
| Intertidal lichen                    | <i>Verrucaria tavaresiae</i>                    | 1 1 0 0 1 | P        |
| California Sea Lion                  | <i>Zalophus californianus</i>                   | 1 0 1 1 0 | P        |
| Point Reyes Jumping Mouse            | <i>Zapus trinotatus orarius</i>                 | 1 1 0 0 1 | P        |
| Sharp-shinned Hawk                   | <i>Accipter striatus</i>                        | 0 1 1 0 0 | P        |
| Chamise                              | <i>Adenostoma fasciculatum</i>                  | 1 0 0 0 1 | P        |
| California false-indigo              | <i>Amorpha californica var. napensis</i>        | 0 1 0 0 1 | P        |
| Bent-flower fiddleneck               | <i>Amsinckia lunaris</i>                        | 0 1 0 0 1 | P        |
| bent-flowered fiddleneck             | <i>Amsinckia lunaris</i>                        | 0 1 0 0 1 | P        |
| Pallid Bat                           | <i>Antrozous pallidus</i>                       | 0 1 0 0 1 | P        |
| Short-eared Owl                      | <i>Asio flammeus</i>                            | 1 1 0 0 0 | P        |
| Top smelt                            | <i>Atherinopsis affinis</i>                     | 1 0 0 1 0 | P        |
| Jacksmelt                            | <i>Atherinopsis californiensis</i>              | 1 0 0 1 0 | P        |
| Ringtail                             | <i>Bassariscus astutus</i>                      | 0 1 0 0 1 | P        |
| Short coastal fructose lichen        | <i>Bryoria subcana</i>                          | 0 1 0 0 1 | P        |
| Coastal bluff morning glory          | <i>Calystegia purpurata saxicola</i>            | 1 0 0 0 1 | P        |



| Common name                 | Scientific name                                | E R I S H | Priority |
|-----------------------------|--|-----------|----------|
| Swamp harebell              | <i>Campanula californica</i>                   | 1 1 0 0 0 | P        |
| Lyngbyei's sedge            | <i>Carex lyngbyei</i>                          | 1 0 0 0 1 | P        |
| Mt. Vison Ceonothus         | <i>Ceanothus gloriosus porrectus</i>           | 0 1 1 0 0 | P        |
| Tall glory-bush             | <i>Ceanothus gloriosus var. exaltus</i>        | 1 0 0 0 1 | P        |
| Spineflower                 | <i>Chorizanthe cuspidata villosa</i>           | 1 1 0 0 0 | P        |
| Raiche's red-ribbons        | <i>Clarkia concinna spp. Raichei</i>           | 0 1 0 0 1 | P        |
| Globose dune beetle         | <i>Coelus globosus</i>                         | 0 1 0 0 1 | P        |
| Monarch butterfly           | <i>Danaus plexippus</i>                        | 0 1 1 0 0 | P        |
| Western leatherwood         | <i>Dirca occidentalis</i>                      | 0 1 0 0 1 | P        |
| Snowy Egret                 | <i>Egretta thula</i>                           | 0 0 1 0 1 | P        |
| White-tailed Kite           | <i>Elanus leucurus</i>                         | 1 0 1 0 0 | P        |
| Northern Anchovy            | <i>Engraulidae mordax mordax</i>               | 1 0 1 0 0 | P        |
| Koch's cord moss            | <i>Entosthodon kochii</i>                      | 0 1 0 0 1 | P        |
| California Horned Lark      | <i>Eremophila alpestris actia</i>              | 0 1 0 0 1 | P        |
| Tiburon buckwheat           | <i>Eriogonum luteolum var. caninum</i>         | 0 1 0 0 1 | P        |
| Merlin                      | <i>Falco columbarius</i>                       | 1 0 1 0 0 | P        |
| American Peregrine Falcon   | <i>Falco peregrine anatum</i>                  | 1 0 1 0 0 | P        |
| American Kestrel            | <i>Falco sparverius</i>                        | 0 1 1 0 0 | P        |
| Dune gilia                  | <i>Gilia capitata chamissonis</i>              | 0 1 0 0 1 | P        |
| San Francisco gumplant      | <i>Grindelia hirsutula maritime</i>            | 0 1 0 0 1 | P        |
| snowy                       | <i>Haliaeetus leucocephalus</i>                | 1 0 1 0 0 | P        |
| Black Albalone              | <i>Haliotis cracherodii</i>                    | 0 1 1 0 0 | P        |
| Pinto Abalone               | <i>Haliotis kamtschatkana</i>                  | 0 1 1 0 0 | P        |
| Marin western flax          | <i>Hesperolinon congestum</i>                  | 1 1 0 0 1 | P        |
| Santa Cruz tarplant         | <i>Holocarpha marcradenia</i>                  | 0 1 0 0 1 | P        |
| Thin-lobed horkelia         | <i>Horkelia tenuiloba</i>                      | 0 1 0 0 1 | P        |
| Marin elfin butterfly       | <i>Incisalia mossii</i>                        | 0 1 0 0 1 | P        |
| Pacific Lamprey             | <i>Lampetra tridentata</i>                     | 1 1 0 0 0 | P        |
| Loggerhead Shrike           | <i>Lanius ludovicianus</i>                     | 0 1 0 0 1 | P        |
| Hoary Bat                   | <i>Lasiurus cinereus</i>                       | 1 1 0 0 0 | P        |
| Rose linanthus              | <i>Leptosiphon rosaceus</i>                    | 0 1 0 0 1 | P        |
| Tamalpais lessingia         | <i>Lessingia micradenia var. micradenia</i>    | 0 0 1 0 1 | P        |
| Bumblebee scarab beetle     | <i>Lichnanthe ursina</i>                       | 0 1 0 0 1 | P        |
| Harlequin lotus             | <i>Lotus formosissimus</i>                     | 0 1 0 0 1 | P        |
| Short-tailed Weasel         | <i>Mustela erminea steatori</i>                | 1 0 0 0 1 | P        |
| Marin navarretia            | <i>Navarretia rosulata</i>                     | 0 1 0 0 1 | P        |
| American White Pelican      | <i>Pelecanus erythrorhynchos</i>               | 0 1 1 0 0 | P        |
| Brandt's Cormorant          | <i>Phalacrocorax penicillatus</i>              | 1 1 0 0 0 | P        |
| Devil's matchsticks         | <i>Philoporus acicularis</i>                   | 1 1 0 0 1 | P        |
| North coast semaphore grass | <i>Pleuropogon hooverianus</i>                 | 0 1 0 0 1 | P        |
| Lobb's water buttercup      | <i>Ranunculus lobbii</i>                       | 0 1 0 0 1 | P        |
| Washington Clam             | <i>Saxidomus nuttalli</i>                      | 1 0 0 1 0 | P        |
| Marin checkerbloom          | <i>Sidalcea hickmanii spp. Viridis</i>         | 0 1 0 0 1 | P        |
| purple checkerbloom         | <i>Sidalcea malviflora ssp. purpurea</i>       | 0 1 0 0 1 | P        |
| Black-chinned Sparrow       | <i>Spizella breweri</i>                        | 0 1 0 0 1 | P        |
| Tiburon jewelflower         | <i>Streptanthus batrachopus</i>                | 0 1 0 0 1 | P        |
| Dune tansy                  | <i>Tanacetum camphoratum (syn: bipinnatum)</i> | 0 1 0 0 1 | P        |

| Common name                       | Scientific name                                  | E R I S H | Priority |
|-----------------------------------|--|-----------|----------|
| Lichenized fungus                 | <i>Teloschistes flavicans</i>                    | 0 1 0 0 1 | P        |
| Thamnomia lichen                  | <i>Thamnomia vermicularis</i>                    | 0 1 0 0 1 | P        |
| California Red-sided Garter Snake | <i>Thamnophis sirtalis infernalis</i>            | 0 1 1 0 0 | P        |
| Leopard shark                     | <i>Triakis semifasciata</i>                      | 1 0 1 0 0 | P        |
| Coastal trichodon                 | <i>Trichodon cylindricus</i>                     | 0 1 0 0 1 | P        |
| Showy indian clover               | <i>Trifolium amoenum</i>                         | 0 1 0 0 1 | P        |
| Creeping seagrass                 | <i>Triglochin concinna</i>                       | 1 0 0 0 1 | P        |
| San Francisco owl's clover        | <i>Triphysaria (syn: Orthocarpus) floribunda</i> | 0 1 1 0 0 | P        |
| Yellow cetrarioid lichen          | <i>Tuckermannopsis canadensis</i>                | 1 0 0 0 1 | P        |
| "Nuttall's" White-crowned Sparrow | <i>Zonotrichia leucophrys nuttalli</i>           | 0 1 0 0 1 | P        |
| Cooper's Hawk                     | <i>Accipiter cooperii</i>                        | 0 0 1 0 0 |          |
| Rufous-crowned Sparrow            | <i>Aimophila ruficeps</i>                        | 0 0 0 0 1 |          |
| "Bell's" Sage Sparrow             | <i>Amphispiza belli belli</i>                    | 0 0 0 0 1 |          |
| Coast rockcress                   | <i>Arabis blepharophylla</i>                     | 0 0 0 0 1 |          |
| Long-eared Owl                    | <i>Asio otus</i>                                 | 0 1 0 0 0 |          |
| Redhead                           | <i>Aythya americana</i>                          | 0 1 0 0 0 |          |
| serpentine reedgrass              | <i>Calamagrostis ophitidis</i>                   | 0 0 0 0 1 |          |
| chaparral redmaids                | <i>Calandrinia breweri</i>                       | 0 0 0 0 1 |          |
| St. Helena morning glory          | <i>Calystegia collina spp. Oxyphylla</i>         | 0 0 0 0 1 |          |
| Variable owls' clover             | <i>Castilleja ambigua ambigua</i>                | 0 1 0 0 0 |          |
| Olive-sided Flycatcher            | <i>Conotopus cooperi</i>                         | 0 1 0 0 0 |          |
| Hermit Warbler                    | <i>Dendroica occidentalis</i>                    | 0 0 0 0 1 |          |
| Bottlebrush grass                 | <i>Elymus californicus</i>                       | 0 0 0 0 1 |          |
| Coast checker lily                | <i>Fritillaria affinis tristulis</i>             | 0 1 0 0 0 |          |
| Fragrant fritillary               | <i>Fritillaria liliacea</i>                      | 0 1 0 0 0 |          |
| Hayfield tarweed                  | <i>Hemizonia congesta congesta</i>               | 0 1 0 0 0 |          |
| Short-leaved Evax                 | <i>Hesperavex sparsiflora brevifolia</i>         | 0 1 0 0 0 |          |
| Least Bittern                     | <i>Ixobrychus exilis</i>                         | 0 1 0 0 0 |          |
| Silver-haired Bat                 | <i>Lasionycteris noctivagans</i>                 | 0 1 0 0 0 |          |
| Western Red Bat                   | <i>Lasiurus blossevillii</i>                     | 0 1 0 0 0 |          |
| Giant perennial goldfields        | <i>Lasthenia californica macrantha</i>           | 0 1 0 0 0 |          |
| Point Reyes Lichen                | <i>Lecanora simeonensis</i>                      | 0 0 0 0 1 |          |
| Bristly linanthus                 | <i>Leptosiphon acicularis</i>                    | 0 0 0 0 1 |          |
| Wolly-headed lessingia            | <i>Lessingia hololeuca</i>                       | 0 0 0 0 1 |          |
| Wildrye spp.                      | <i>Leymus mollis pacificus, tricoides</i>        | 0 0 0 0 1 |          |
| Western lilaeopsis                | <i>Lilaeopsis occidentalis</i>                   | 0 0 0 0 1 |          |
| Black Scoter                      | <i>Melanitta nigra</i>                           | 0 1 0 0 0 |          |
| Marsh silverpuffs                 | <i>Microseris paldosa</i>                        | 0 1 0 0 0 |          |
| Western Small-footed Myotis       | <i>Myotis ciliolabrum</i>                        | 0 1 0 0 0 |          |
| Long-eared Myotis                 | <i>Myotis evotis</i>                             | 0 1 0 0 0 |          |
| Little Brown Bat                  | <i>Myotis lucifugus</i>                          | 0 1 0 0 0 |          |
| Fringed Myotis                    | <i>Myotis thysanodes</i>                         | 0 1 0 0 0 |          |
| Long-legged Myotis                | <i>Myotis volans</i>                             | 0 1 0 0 0 |          |
| Yuma Myotis                       | <i>Myotis yumanensis</i>                         | 0 1 0 0 0 |          |
| Dusky-footed Woodrat              | <i>Neotoma fuscipes</i>                          | 1 0 0 0 0 |          |
| San Francisco Lacewing            | <i>Nothochrysa californica</i>                   | 0 1 0 0 0 |          |
| Gairdner's yampah                 | <i>Perideridia gairdneri gairdneri</i>           | 0 1 0 0 0 |          |

| <b>Common name</b>               | <b>Scientific name</b>                  | <b>E R I S H Priority</b> |
|----------------------------------|---|---------------------------|
| Red-necked Grebe                 | <i>Podiceps grisegena</i>               | 0 0 0 0 1                 |
| Marin knotweed                   | <i>Polygonum marinensis</i>             | 0 0 0 0 1                 |
| Coast pearlwort                  | <i>Sagina maxima crassicaulis</i>       | 0 0 0 0 1                 |
| Allen's Hummingbird              | <i>Selasphorus sasin</i>                | 0 0 1 0 0                 |
| Beach starwort                   | <i>Stellaria littoralis</i>             | 0 1 0 0 0                 |
| Slender arrowgrass               | <i>Triglochin striata</i>               | 0 1 0 0 0                 |
| Clark's Grebe                    | <i>Aechmophorus clarkii</i>             | 0 0 0 0 0                 |
| Western Grebe                    | <i>Aechmophorus occidentalis</i>        | 0 0 0 0 0                 |
| Oak Titmouse                     | <i>Baeolophus inornatus</i>             | 0 0 0 0 0                 |
| Coastal horsehair lichen         | <i>Bryoria spiralifera</i>              | 0 0 0 0 0                 |
| Large-flowered coastal chickweed | <i>Cerastium viride</i>                 | 0 0 0 0 0                 |
| Lark Sparrow                     | <i>Chondestes grammacus</i>             | 0 0 0 0 0                 |
| Sharp-tailed Snake               | <i>Contia tenuis</i>                    | 0 0 0 0 0                 |
| Pacific Ring-necked Snake        | <i>Diadophis punctatus (amabilis)</i>   | 0 0 0 0 0                 |
| Oregon gentian                   | <i>Gentiana affinis ovate</i>           | 0 0 0 0 0                 |
| California fairypoppy            | <i>Meconella californica</i>            | 0 0 0 0 0                 |
| Leptostracan Crustacean          | <i>Nebalia kensleyi</i>                 | 0 0 0 0 0                 |
| Nuttall's Woodpecker             | <i>Picooides nuttallii</i>              | 0 0 0 0 0                 |
| Aquatic gartersnake              | <i>Thamnophis atratus (intergrades)</i> | 0 0 0 0 0                 |
| Marsh zigadene                   | <i>Toxicoscordion fontanum</i>          | 0 0 0 0 0                 |

**Appendix 4.** Local Ecological Pest Species in the Tomales Bay watershed. Criterion scores (0 = no, 1 = yes; Table 1) for Presence (P), Status on other lists (L), Major ecological threat (T), Abundant or increasing (A), and Socio-economic significance (S), and rankings for High Priority (HP) and Priority (P) species are indicated.

| Common name                | Scientific name                           | P | L | T | A | S | Priority |
|----------------------------|---|---|---|---|---|---|----------|
| Barbed goatgrass           | <i>Aegilops triuncialis</i>               | 1 | 1 | 1 | 1 | 1 | HP       |
| European Beach Grass       | <i>Ammophila arenaria</i>                 | 1 | 1 | 1 | 1 | 1 | HP       |
| European green crab        | <i>Carcinus maenas</i>                    | 1 | 1 | 1 | 1 | 1 | HP       |
| Giant plumeless thistle    | <i>Carduus acanthoides</i>                | 1 | 1 | 1 | 1 | 1 | HP       |
| distaff thistle            | <i>Carthamus lanatus</i>                  | 1 | 1 | 1 | 1 | 1 | HP       |
| Napa thistle (Tocalote)    | <i>Centaurea melitensis</i>               | 1 | 1 | 1 | 1 | 1 | HP       |
| purple star thistle        | <i>Centaurea calcitrapa</i>               | 1 | 1 | 1 | 1 | 1 | HP       |
| Yellow star thistle        | <i>Centaurea solstitialis</i>             | 1 | 1 | 1 | 1 | 1 | HP       |
| Canada thistle             | <i>Cirsium arvense</i>                    | 1 | 1 | 1 | 1 | 1 | HP       |
| Bull thistle               | <i>Cirsium vulgare</i>                    | 1 | 1 | 1 | 1 | 1 | HP       |
| Scotch broom               | <i>Cytisus scoparius</i>                  | 1 | 1 | 1 | 1 | 1 | HP       |
| Cape ivy                   | <i>Delairea odorata</i>                   | 1 | 1 | 1 | 1 | 1 | HP       |
| Colonial sea squirt        | <i>Didemnum sp. A</i>                     | 1 | 1 | 1 | 1 | 1 | HP       |
| Invasive colonial tunicate | <i>Didemnum vexillum</i>                  | 1 | 1 | 1 | 1 | 1 | HP       |
| veldt grass                | <i>Ehrharta erecta</i>                    | 1 | 1 | 1 | 1 | 1 | HP       |
| eucalyptus                 | <i>Eucalyptus globulus</i>                | 1 | 1 | 1 | 1 | 1 | HP       |
| Mosquito fish              | <i>Gambusia holbrooki</i>                 | 1 | 1 | 1 | 1 | 1 | HP       |
| French broom               | <i>Genista monspessulana</i>              | 1 | 1 | 1 | 1 | 1 | HP       |
| Velvet grass               | <i>Holcus lanatus</i>                     | 1 | 1 | 1 | 1 | 1 | HP       |
| Wild Turkey                | <i>Meleagris gallopavo</i>                | 1 | 1 | 1 | 1 | 1 | HP       |
| Harding grass              | <i>Phalaris aquatica</i>                  | 1 | 1 | 1 | 1 | 1 | HP       |
| American Bullfrog          | <i>Rana catesbeiana</i>                   | 1 | 1 | 1 | 1 | 1 | HP       |
| Barred Owl                 | <i>Strix varia</i>                        | 1 | 1 | 1 | 1 | 1 | HP       |
| Medusahead                 | <i>Taeniatherum caput-medusae</i>         | 1 | 1 | 1 | 1 | 1 | HP       |
| Common gorse               | <i>Ulex europaeus</i>                     | 1 | 1 | 1 | 1 | 1 | HP       |
| Black acacia               | <i>Acacia melanoxylon</i>                 | 1 | 1 | 1 | 1 | 0 | HP       |
| Black acacia               | <i>Acacia dealbata</i>                    | 1 | 1 | 1 | 1 | 0 | HP       |
| Fertile capeweed           | <i>Arctotheca calendula</i>               | 1 | 1 | 1 | 1 | 0 | HP       |
| Common reed                | <i>Arundo donax</i>                       | 0 | 1 | 1 | 1 | 1 | HP       |
| Star Sea Squirt            | <i>Botryllus schlosseri</i>               | 1 | 0 | 1 | 1 | 1 | HP       |
| Coyote                     | <i>Canis latrans</i>                      | 1 | 1 | 0 | 1 | 1 | HP       |
| iceplant                   | <i>Carpobrotus edulis &amp; chilensis</i> | 1 | 1 | 1 | 1 | 0 | HP       |
| Iberian starthistle        | <i>Centaurea iberica</i>                  | 0 | 1 | 1 | 1 | 1 | HP       |
| poison-hemlock             | <i>Conium maculatum</i>                   | 1 | 1 | 1 | 1 | 0 | HP       |
| Pampas grass               | <i>Cortadera jubata</i>                   | 1 | 1 | 1 | 1 | 0 | HP       |
| Orange cotoneaster.        | <i>Cotoneaster francheti</i>              | 1 | 1 | 1 | 1 | 0 | HP       |
| Silverleaf cotoneaster     | <i>Cotoneaster pannosus</i>               | 1 | 1 | 1 | 1 | 0 | HP       |
| Portuguese broom           | <i>Cytisus striatus</i>                   | 1 | 1 | 1 | 1 | 0 | HP       |
| oblong spurge              | <i>Euphorbia oblongata</i>                | 1 | 1 | 1 | 1 | 0 | HP       |
| tall fescue                | <i>Festuca arundinacea</i>                | 1 | 1 | 1 | 1 | 0 | HP       |
| Mosquito fish              | <i>Gambusia affinis</i>                   | 1 | 0 | 1 | 1 | 1 | HP       |
| Klamathweed                | <i>Hypericum perforatum</i>               | 1 | 1 | 1 | 1 | 0 | HP       |
| rough cat's-ear            | <i>Hypochaeris radicata</i>               | 1 | 1 | 1 | 1 | 0 | HP       |

| Common name               | Scientific name                     | P | L | T | A | S | Priority |
|---------------------------|-------------------------------------|---|---|---|---|---|----------|
| Channel catfish           | <i>Ictalurus punctatus</i>          | 1 | 1 | 1 | 0 | 1 | HP       |
| Perennial pepperweed      | <i>Lepidium latifolium</i>          | 1 | 1 | 1 | 1 | 0 | HP       |
| Large-mouth bass          | <i>Micropterus salmoides</i>        | 1 | 1 | 1 | 0 | 1 | HP       |
| Striped bass              | <i>Morone (Roccus) saxatilis</i>    | 1 | 0 | 1 | 1 | 1 | HP       |
| Kikuyugrass               | <i>Pennisetum clandestinum</i>      | 1 | 1 | 1 | 1 | 0 | HP       |
| Sudden Oak Death          | <i>Phytophthora ramorum</i>         | 1 | 1 | 1 | 0 | 1 | HP       |
| Black crappie             | <i>Pomoxis nigromaculatus</i>       | 1 | 1 | 1 | 0 | 1 | HP       |
| Black locust              | <i>Robinia pseudoacacia</i>         | 1 | 1 | 1 | 1 | 0 | HP       |
| dense cordgrass           | <i>Spartina densiflora</i>          | 1 | 1 | 1 | 1 | 0 | HP       |
| Spanish broom             | <i>Spartium junceum</i>             | 1 | 1 | 1 | 1 | 0 | HP       |
| Eurasian Collared Dove    | <i>Streptopelia decaocto</i>        | 1 | 1 | 1 | 1 | 0 | HP       |
| Atlantic oyster drill     | <i>Urosalpinx cinerea</i>           | 1 | 1 | 1 | 0 | 1 | HP       |
| Japanese Littleneck clam  | <i>Venerupis philippinarum</i>      | 1 | 1 | 0 | 1 | 1 | HP       |
| Spiny cocklebur           | <i>Xanthium spinosum</i>            | 1 | 1 | 1 | 0 | 1 | HP       |
| Yellowfin goby            | <i>Acanthogobius flavimanus</i>     | 1 | 1 | 1 | 0 | 0 | P        |
| Eupatorium                | <i>Ageratina adenophora</i>         | 1 | 1 | 1 | 0 | 0 | P        |
| Tree of heaven            | <i>Ailanthus altissima</i>          | 1 | 1 | 1 | 0 | 0 | P        |
| Barred Tiger Salamander   | <i>Ambystoma tigrinum mavortium</i> | 0 | 1 | 1 | 1 | 0 | P        |
| Australian saltbush       | <i>Atriplex semibaccata</i>         | 1 | 0 | 1 | 1 | 0 | P        |
| Wild mustard              | <i>Brassica nigra</i>               | 1 | 1 | 0 | 1 | 0 | P        |
| Cheat grass               | <i>Bromus tectorum</i>              | 1 | 1 | 0 | 1 | 0 | P        |
| Goldfish                  | <i>Carassius auratus auratus</i>    | 1 | 1 | 1 | 0 | 0 | P        |
| Italian thistle           | <i>Carduus pynoccephalus</i>        | 1 | 1 | 1 | 0 | 0 | P        |
| White pine blister rust   | <i>Cronartium ribicola</i>          | 0 | 1 | 1 | 0 | 1 | P        |
| Common carp               | <i>Cyprinus carpio</i>              | 1 | 1 | 1 | 0 | 0 | P        |
| Fallow deer               | <i>Dama dama</i>                    | 1 | 1 | 1 | 0 | 0 | P        |
| Stinkweed                 | <i>Dittrichia graveolens</i>        | 1 | 1 | 0 | 1 | 0 | P        |
| Perennial veldtgrass      | <i>Ehrharta calycina</i>            | 0 | 1 | 1 | 1 | 0 | P        |
| Chinese Mitten Crab       | <i>Eriocheir sinensis</i>           | 0 | 1 | 1 | 0 | 1 | P        |
| caper spurge              | <i>Euphorbia lathyris</i>           | 1 | 0 | 1 | 1 | 0 | P        |
| Domestic cat              | <i>Felis silvestris</i>             | 1 | 0 | 1 | 1 | 0 | P        |
| fennel                    | <i>Foeniculum vulgare</i>           | 1 | 1 | 1 | 0 | 0 | P        |
| English holly             | <i>Ilex aquifolium</i>              | 1 | 1 | 1 | 0 | 0 | P        |
| Argentine ant             | <i>Iridomyrmex humilis</i>          | 1 | 1 | 1 | 0 | 0 | P        |
| Bluegill                  | <i>Lepomis macrochirus</i>          | 1 | 1 | 1 | 0 | 0 | P        |
| Green sunfish             | <i>Lepomis cyanellis</i>            | 1 | 1 | 1 | 0 | 0 | P        |
| Redear sunfish            | <i>Lepomis microlophus</i>          | 1 | 1 | 1 | 0 | 0 | P        |
| Ox-eye daisy              | <i>Leucanthemum vulgare</i>         | 1 | 1 | 0 | 1 | 0 | P        |
| Pennyroyal                | <i>Mentha pelegium</i>              | 1 | 1 | 1 | 0 | 0 | P        |
| Golden shiner             | <i>Notemigonus crysoleucas</i>      | 1 | 1 | 1 | 0 | 0 | P        |
| White crappie             | <i>Pomoxis annularis</i>            | 1 | 1 | 1 | 0 | 0 | P        |
| Himalaya blackberry       | <i>Rubus discolor</i>               | 1 | 1 | 0 | 1 | 0 | P        |
| Eastern Fox Squirrel      | <i>Sciurus niger</i>                | 1 | 0 | 1 | 1 | 0 | P        |
| Red-eared Slider          | <i>Trachemys scripta elegans</i>    | 1 | 1 | 1 | 0 | 0 | P        |
| Periwinkle                | <i>Vinca major</i>                  | 1 | 1 | 1 | 0 | 0 | P        |
| Red Fox                   | <i>Vulpes fuscipes</i>              | 1 | 1 | 1 | 0 | 0 | P        |
| Dwarf (Japanese) eelgrass | <i>Zostera japonica</i>             | 0 | 1 | 1 | 0 | 1 | P        |

| Common name                            | Scientific name                  | P | L | T | A | S | Priority |
|--|----------------------------------|---|---|---|---|---|----------|
| Toxic Dinoflagellate                   | <i>Alexandrium minutum</i>       | 0 | 1 | 0 | 0 | 1 | P        |
| Rattlesnake grass                      | <i>Briza maxima</i>              | 1 | 0 | 1 | 0 | 0 | P        |
| Pampgrass                              | <i>Cortadera selloana</i>        | 0 | 1 | 1 | 0 | 0 | P        |
| Orchard Grass                          | <i>Dactylis glomerata</i>        | 1 | 0 | 1 | 0 | 0 | P        |
| Ribbed mussel                          | <i>Geukensia demissa</i>         | 1 | 0 | 1 | 0 | 0 | P        |
| Licorice plant                         | <i>Helichrysum petiolare</i>     | 1 | 1 | 0 | 0 | 0 | P        |
| Perennial pea                          | <i>Lathyrus latifolius</i>       | 1 | 1 | 0 | 0 | 0 | P        |
| House Mouse                            | <i>Mus musculus</i>              | 1 | 0 | 1 | 0 | 0 | P        |
| Soft-shell clam                        | <i>Mya arenaria</i>              | 0 | 0 | 1 | 0 | 1 | P        |
| English (House) Sparrow                | <i>Passer domesticus</i>         | 1 | 0 | 1 | 0 | 0 | P        |
| Norway Rat                             | <i>Rattus norvegicus</i>         | 1 | 0 | 1 | 0 | 0 | P        |
| Black Rat                              | <i>Rattus rattus</i>             | 1 | 0 | 1 | 0 | 0 | P        |
| Smooth cordgrass                       | <i>Spartina alterniflora</i>     | 0 | 1 | 1 | 0 | 0 | P        |
| European Starling                      | <i>Sternus vulgaris</i>          | 1 | 0 | 1 | 0 | 0 | P        |
| Leathery sea squirt (Clubbed tunicate) | <i>Styela clava</i>              | 1 | 1 | 0 | 0 | 0 | P        |
| Japanese Mysid                         | <i>Acanthomysis aspera</i>       | 0 | 1 | 0 | 0 | 0 |          |
| Atlantic Bryozoan                      | <i>Alcyonidium gelatinosum</i>   | 0 | 1 | 0 | 0 | 0 |          |
| Chukar                                 | <i>Alectoris chukar</i>          | 1 | 0 | 0 | 0 | 0 |          |
| European Eel                           | <i>Anguilla anguilla</i>         | 0 | 1 | 0 | 0 | 0 |          |
| Knotted wrack (brown algae)            | <i>Ascophyllum nodosum</i>       | 0 | 0 | 1 | 0 | 0 |          |
| Purple Acorn Barnacle                  | <i>Balanus amphitrite</i>        | 0 | 1 | 0 | 0 | 0 |          |
| Japanese Mud Snail                     | <i>Batillaria attramentaria</i>  | 0 | 1 | 0 | 0 | 0 |          |
| Chain Sea Squirt                       | <i>Botrylloides violaceus</i>    | 1 | 0 | 0 | 0 | 0 |          |
| Tubificid Worm                         | <i>Branchiura sowerbyi</i>       | 0 | 1 | 0 | 0 | 0 |          |
| Purple bryozoan                        | <i>Bugula neritina</i>           | 1 | 0 | 0 | 0 | 0 |          |
| Pacific transparent tunicate Tunicate  | <i>Ciona savignyi</i>            | 0 | 1 | 0 | 0 | 0 |          |
| Encrusting bryozoan                    | <i>Cryptosula pallasiana</i>     | 1 | 0 | 0 | 0 | 0 |          |
| Orange-Striped Green Anemone           | <i>Diadumene lineata</i>         | 1 | 0 | 0 | 0 | 0 |          |
| Hard Clam                              | <i>Meretrix lusoria</i>          | 0 | 0 | 1 | 0 | 0 |          |
| Green bagmussel                        | <i>Musculista senhousia</i>      | 1 | 0 | 0 | 0 | 0 |          |
| Mouse-ear marshsnail                   | <i>Myosotella myosotis</i>       | 1 | 0 | 0 | 0 | 0 |          |
| Muskrat                                | <i>Ondatra zibethicus</i>        | 1 | 0 | 0 | 0 | 0 |          |
| Griffon's isopod                       | <i>Orthione griffenis</i>        | 1 | 0 | 0 | 0 | 0 |          |
| Ring-necked Pheasant                   | <i>Phasianus colchicus</i>       | 1 | 0 | 0 | 0 | 0 |          |
| Victorian box                          | <i>Pittosporum undulatum</i>     | 1 | 0 | 0 | 0 | 0 |          |
| Asian clam                             | <i>Potamocorbula armurensis</i>  | 1 | 0 | 0 | 0 | 0 |          |
| Raccoon                                | <i>Procyon lotor</i>             | 1 | 0 | 0 | 0 | 0 |          |
| Salt meadow cordgrass                  | <i>Spartina patens</i>           | 0 | 1 | 0 | 0 | 0 |          |
| New Zealand isopod                     | <i>Sphaeroma quoianum</i>        | 0 | 0 | 1 | 0 | 0 |          |
| Japanese Littleneck Clam               | <i>Tapes philippinarum</i>       | 0 | 1 | 0 | 0 | 0 |          |
| Miniature Aeolis                       | <i>Tenellia adspersa</i>         | 0 | 1 | 0 | 0 | 0 |          |
| Asian Semele                           | <i>Theora lubrica</i>            | 0 | 1 | 0 | 0 | 0 |          |
| Asian Copepod                          | <i>Tortanus dextrilobatus</i>    | 0 | 1 | 0 | 0 | 0 |          |
| Trembling Sea Mat Bryozoan             | <i>Victorella pavida</i>         | 0 | 1 | 0 | 0 | 0 |          |
| Chinese Mystery Snail                  | <i>Cipangopaludina chinensis</i> | 0 | 0 | 0 | 0 | 0 |          |
| Edaasi Kurage                          | <i>Cladonema uchidai</i>         | 0 | 0 | 0 | 0 | 0 |          |
| Chinese Clam                           | <i>Corbicula fluminea</i>        | 0 | 0 | 0 | 0 | 0 |          |

| Common name                 | Scientific name                       | P | L | T | A | S | Priority |
|-----------------------------|---------------------------------------|---|---|---|---|---|----------|
| Overbite clam               | <i>Corbulka amurensis</i>             | 0 | 0 | 0 | 0 | 0 | 0        |
| Asian shrimp                | <i>Corophium? acherusicum?</i>        | 0 | 0 | 0 | 0 | 0 | 0        |
| Lake Merritt Cuthona        | <i>Cuthona perca</i>                  | 0 | 0 | 0 | 0 | 0 | 0        |
| Misaki Balloon Aeolis       | <i>Eubranchus misakiensis</i>         | 0 | 0 | 0 | 0 | 0 | 0        |
| New Zealand Isopod          | <i>Eurylana arcuata</i>               | 0 | 0 | 0 | 0 | 0 | 0        |
| Pelo de Oso                 | <i>Garveia franciscana</i>            | 0 | 0 | 0 | 0 | 0 | 0        |
| Blacktip Shipworm           | <i>Lyrodus pedicellatus</i>           | 0 | 0 | 0 | 0 | 0 | 0        |
| Black sea jellyfish         | <i>Maeotias inexpectata</i>           | 0 | 0 | 0 | 0 | 0 | 0        |
| Sea Grapes                  | <i>Molgula manhattensis</i>           | 0 | 0 | 0 | 0 | 0 | 0        |
| Japanese Copepod            | <i>Mytilicola orientalis</i>          | 0 | 0 | 0 | 0 | 0 | 0        |
| Asian Cumacean              | <i>Nippoleucon hinumensis</i>         | 0 | 0 | 0 | 0 | 0 | 0        |
| Nutty limpet                | <i>Nutilina obscurata</i>             | 0 | 0 | 0 | 0 | 0 | 0        |
| Sea Thread Hydroid          | <i>Obelia dichotoma</i>               | 0 | 0 | 0 | 0 | 0 | 0        |
| Flat Okenia                 | <i>Okenia plana</i>                   | 0 | 0 | 0 | 0 | 0 | 0        |
| Mud Oyster                  | <i>Ostrea sinuata</i>                 | 0 | 0 | 0 | 0 | 0 | 0        |
| Derzhav Amphipod            | <i>Parapleustes derzhavini</i>        | 0 | 0 | 0 | 0 | 0 | 0        |
| New Zealand Sea Slug        | <i>Philine auriformis</i>             | 0 | 0 | 0 | 0 | 0 | 0        |
| New Zealand Mudsnaill       | <i>Potamopyrgus antipodarum</i>       | 0 | 0 | 0 | 0 | 0 | 0        |
| Red swamp crayfish          | <i>Procambarus clarkii</i>            | 0 | 0 | 0 | 0 | 0 | 0        |
| Calanoid Copepod            | <i>Pseudodiaptomus marinus</i>        | 0 | 0 | 0 | 0 | 0 | 0        |
| Spionid Worm                | <i>Pseudopolydora paucibranchiata</i> | 0 | 0 | 0 | 0 | 0 | 0        |
| Winged oyster               | <i>Pteria sterna</i>                  | 0 | 0 | 0 | 0 | 0 | 0        |
| Big-ear Radix               | <i>Radix auricularia</i>              | 0 | 0 | 0 | 0 | 0 | 0        |
| White-tentacled Japanese Ae | <i>Sakuraeolis enosimensis</i>        | 0 | 0 | 0 | 0 | 0 | 0        |
| Snapping Shrimp             | <i>Salmones gracilipes</i>            | 0 | 0 | 0 | 0 | 0 | 0        |
| Tanaid                      | <i>Sinelobus sp.</i>                  | 0 | 0 | 0 | 0 | 0 | 0        |
| Wakame (Asian clam)         | <i>Undrina pinnatifida</i>            | 0 | 0 | 0 | 0 | 0 | 0        |
| Collared Bryozoan           | <i>Watersipora subtorquata</i>        | 0 | 0 | 0 | 0 | 0 | 0        |