

**Table 7 – Recommended Target Plant Species Removal Methods**

Method	Appropriate Use	Timing	Materials and Tools	Instructions	Advantages	Disadvantages
<b>Arundo and/or Tamarisk</b>						
<b>Hand Removal and Paint/Daub</b>	Any size stand. Stand may be intermixed with native plants.	Spring through fall depending on herbicide used.	Chainsaws, loppers, or similar equipment for cutting biomass. Herbicide, surfactant, and colorant. Paintbrushes, sponge daubers, or similar equipment for herbicide application. Chippers to reduce biomass of cut vegetation (optional). Haul trucks or similar equipment to remove cut biomass.	Cut target plants within six inches of the ground. Leave roots and rhizomes in the ground. Apply herbicide to cut stem surface within minutes after cutting. Dispose of cut biomass at a landfill, chip and dispose of biomass at a landfill, or chip biomass and haul off-site for beneficial reuse.	Effective on any size stand. High mortality rate of target species. Little risk of herbicide drift to non-target plants and wildlife. Little soil disturbance. Minimal potential disturbance to native plants and/or wildlife. Chipped biomass may be used for mulch or other beneficial purposes. Biomass removal may reduce flooding and fire hazard.	May be public concern with herbicide use. If extensive biomass removal is required, additional time and labor costs may be incurred.
<b>Hand Removal and Spray Resprouts</b>	Any size stand. Stand may be intermixed with native plants.	Spring through fall depending on herbicide used.	Chainsaws, loppers, or similar equipment for cutting biomass. Chippers to reduce biomass of cut vegetation (optional). Haul trucks or similar equipment to remove cut biomass. Herbicide, surfactant, colorant, and water. Backpack sprayers, spray rigs, or similar equipment for herbicide application.	Cut target plants within six inches of the ground one to two months prior to spraying. Leave roots and rhizomes in the ground. Dispose of cut biomass at a landfill, chip and dispose of biomass at a landfill, or chip biomass and haul off-site for beneficial reuse. Apply herbicide one to two months after initial biomass removal to allow for significant resprouting (until resprouts are one to three feet tall). Apply herbicide on leaves and stems of target species.	Effective on any size stand. Less herbicide needed than with full stands of target plants. Little risk of herbicide drift to non-target plants and wildlife. Little soil disturbance. Minimal potential disturbance to native plants and/or wildlife. Chipped biomass may be used for mulch or other beneficial purposes. Biomass removal may reduce flooding and fire hazard.	Waiting for resprouts after cutting may be impractical in remote areas. May be public concern with herbicide use. If extensive biomass removal is required, additional time and labor costs may be incurred.
<b>Mechanical Removal and Spray Resprouts</b>	Any size stand not intermixed with native plants. Areas with easy access for equipment.	Spring through fall depending on herbicide used.	Brush grinders, flail mowers, or similar equipment for shredding biomass. Herbicide, surfactant, colorant, and water. Backpack sprayers, spray rigs, or similar equipment for herbicide application.	Shred target plants within six inches of the ground one to two months prior to spraying. Leave roots and rhizomes in the ground. Leave shredded biomass in place. Apply herbicide one to two months after initial biomass removal to allow for significant resprouting (until resprouts are one to three feet tall). Apply herbicide on leaves and stems of target species.	Less herbicide needed than with full stands of target plants. Little risk of herbicide drift to non-target plants and wildlife. Effective reduction of biomass with mechanical removal. Biomass removal may reduce flooding and fire hazard.	Waiting for resprouts after cutting may be impractical in remote areas. Potential for soil disturbance and collateral impacts to native plants, wildlife, and habitat. May be public concern with herbicide use. Need suitable access for mechanical removal equipment.
<b>Foliar Spray</b>	Any size stand not intermixed with native plants. Where no fire/flood hazard is present. Areas with easy access for equipment if lift is used.	Spring through fall depending on herbicide used.	Herbicide, surfactant, colorant, and water. Backpack sprayers, spray rigs, or similar equipment for herbicide application. Ladders or lifts to access tall stands.	Apply herbicide on leaves and stems of target species. Leave dead biomass standing to naturally degrade over time.	Effective on any size stand. Short duration of labor. Little soil disturbance. Minimal potential disturbance to native plants and/or wildlife.	Potential risk of herbicide drift to non-target plants and wildlife or adjacent sensitive receptors. May be public concern with herbicide use. Need suitable access for equipment.

**Table 7 – Recommended Target Plant Species Removal Methods (continued)**

Method	Appropriate Use	Timing	Materials and Tools	Instructions	Advantages	Disadvantages
<b>Arundo and/or Tamarisk (continued)</b>						
<b>Foliar Spray and Hand Removal</b>	Any size stand. Stand may be intermixed with native plants.	Spring through fall depending on herbicide used.	Herbicide, surfactant, colorant, and water. Backpack sprayers, spray rigs, or similar equipment for herbicide application. Ladders or lifts to access tall stands. Chainsaws, loppers, or similar equipment for cutting biomass. Chippers to reduce biomass of hand-cut vegetation (optional). Haul trucks or similar equipment to remove cut biomass.	Apply herbicide on leaves and stems of target species. Allow adequate time for herbicide to act. Cut dead biomass within six inches of the ground. Leave roots and rhizomes in the ground. Dispose of cut biomass at a landfill, chip and dispose of biomass at a landfill, or chip biomass and haul off-site for beneficial reuse.	Effective on any size stand. Little soil disturbance. Minimal potential disturbance to native plants and/or wildlife. Depending on herbicide used, chipped biomass may be used for mulch or other beneficial purposes. Biomass removal may reduce flooding and fire hazard.	Potential risk of herbicide drift to non-target plants and wildlife or adjacent sensitive receptors. May be public concern with herbicide use. If extensive biomass removal is required, additional time and labor costs may be incurred.
<b>Foliar Spray and Mechanical Removal</b>	Any size stand not intermixed with native plants. Areas with easy access for equipment.	Spring through fall depending on herbicide used.	Herbicide, surfactant, colorant, and water. Backpack sprayers, spray rigs, or similar equipment for herbicide application. Ladders or lifts to access tall stands. Brush grinders, flail mowers, or similar equipment for shredding biomass.	Apply herbicide on leaves and stems of target species. Allow adequate time for herbicide to act. Shred dead biomass within six inches of the ground. Leave roots and rhizomes in the ground. Leave shredded biomass in place.	Effective on any size stand. Efficient reduction of biomass for large stands. Biomass removal may reduce flooding and fire hazard.	Potential for soil disturbance and collateral impacts to native plants, wildlife, and habitat. Need suitable access for equipment.
<b>Tamarisk only</b>						
<b>Basal Bark Treatment</b>	Any size stand. Stand may be intermixed with native plants. For trunks six inches or less in diameter. Where no fire/flood hazard is present.	Spring through fall depending on herbicide used.	Herbicide, surfactant, colorant, and water. Backpack sprayers or similar equipment for herbicide application.	Apply herbicide by spraying basal bark of tamarisk.	Effective on any size stand. Short duration of labor. Little risk of herbicide drift to non-target plants and wildlife. Little soil disturbance. Minimal potential disturbance to native plants and/or wildlife.	May be public concern with herbicide use.
<b>Basal Bark Treatment and Hand Removal</b>	Any size stand. Stand may be intermixed with native plants. For trunks six inches or less in diameter.	Spring through fall depending on herbicide used.	Herbicide, surfactant, colorant, and water. Backpack sprayers or similar equipment for herbicide application. Chainsaws, loppers, or similar equipment for cutting biomass. Chippers to reduce biomass of hand-cut vegetation (optional). Haul trucks or similar equipment to remove cut biomass.	Apply herbicide by spraying basal bark of tamarisk. Allow adequate time for herbicide to act. Cut trunks and/or stems of dead biomass within six inches of the ground. Leave roots and rhizomes in the ground. Dispose of cut biomass at a landfill or chip and dispose of biomass at a landfill.	Effective on any size stand. Little risk of herbicide drift to non-target plants and wildlife. Little soil disturbance. Minimal potential disturbance to native plants and/or wildlife. Biomass removal may reduce flooding and fire hazard.	May be public concern with herbicide use. If extensive biomass removal is required, additional time and labor costs may be incurred.

**Table 8 – Other Target Plant Species Removal Methods**

Method	Appropriate Use	Timing	Materials and Tools	Instructions	Advantages	Disadvantages
<b>Arundo and/or Tamarisk</b>						
<b>Hand Removal and Spray</b>	Any size stand Stand may be intermixed with native plants.	Spring through fall depending on herbicide used.	Chainsaws, loppers, or similar equipment to cut biomass. Herbicide, surfactant, colorant, and water. Backpack sprayers, spray rigs, or similar equipment for herbicide application. Chippers to reduce biomass of hand-cut vegetation (optional). Haul trucks or similar equipment to remove cut biomass.	Cut target plants to four or five feet in height. Leave roots and rhizomes in the ground. Apply herbicide on leaves and stems of target species. Dispose of cut biomass at a landfill, chip and dispose of biomass at a landfill, or chip biomass and haul off-site for beneficial reuse.	Effective on any size stand. Little soil disturbance. Minimal potential disturbance to native plants and/or wildlife. Chipped biomass may be used for mulch or other beneficial purposes. Biomass removal may reduce flooding and fire hazard.	Potential risk of herbicide drift to non-target plants and wildlife or adjacent sensitive receptors. Stalks intended for spraying may be trampled during cutting and missed during herbicide application. May be public concern with herbicide use. If extensive biomass removal is required, additional time and labor costs may be incurred.
<b>Mechanical Removal and Spray</b>	Any size stand not intermixed with native plants. Areas with easy access for equipment.	Spring through fall depending on herbicide used.	Masticators or similar equipment to cut biomass. Herbicide, surfactant, colorant, and water. Backpack sprayers, spray rigs, or similar equipment for herbicide application. Chippers to reduce biomass of hand-cut vegetation (optional). Haul trucks or similar equipment to remove cut biomass.	Cut target plants to four or five feet in height. Leave roots and rhizomes in the ground. Apply herbicide on leaves and stems of target species. Dispose of cut biomass at a landfill, chip and dispose of biomass at a landfill, or chip biomass and haul off-site for beneficial reuse.	Effective on any size stand. Efficient reduction of biomass if mechanical removal used. Chipped biomass may be used for mulch or other beneficial purposes. Biomass removal may reduce flooding and fire hazard.	Potential risk of herbicide drift to non-target plants and wildlife or adjacent sensitive receptors. May be public concern with herbicide use. If extensive biomass removal is required, additional time and labor costs may be incurred. Masticator may disturb the soil and cause collateral impacts to native plants, wildlife, and habitat. Need suitable access for equipment if masticator is used.
<b>Above-Ground Hand Removal</b>	Small stands. Where there is concern with herbicide use. Stand may be intermixed with native plants.	Most effective during the growing season (spring through fall).	Chainsaws, loppers, or similar equipment to cut biomass. Chippers to reduce biomass of hand-cut vegetation (optional). Haul trucks or similar equipment to remove cut biomass.	Cut target plants within six inches of the ground. Leave roots and rhizomes in the ground. Chip biomass and haul off-site for beneficial reuse, chip biomass and dispose at a landfill, or dispose of cut biomass at a landfill.	Minimal potential disturbance to native plants and/or wildlife. Little soil disturbance. Chipped biomass may be used for mulch or other beneficial purposes. Biomass removal may reduce flooding and fire hazard.	Very low mortality rates require repeated re-treatment (five years or more), increasing project cost and frequency of disturbance to sensitive areas. If extensive biomass removal is required, additional time and labor costs may be incurred.
<b>Above and Below-Ground Hand Removal</b>	Young plants and small stands. Where there is concern with herbicide use. Stand may be intermixed with native plants.	Any time of year.	Chainsaws, loppers, or similar equipment to cut above-ground biomass. Pick-axes, mattocks, shovels, “weed wrenches”, or similar equipment for extracting below-ground biomass. Chippers to reduce biomass of hand-cut vegetation (optional). Haul trucks or similar equipment to remove cut biomass.	Cut target plants within six inches of the ground. Dig up roots and rhizomes. Chip above-ground biomass to reduce biomass or for beneficial reuse(optional). Dispose of all biomass at a landfill, or haul chipped biomass off-site for beneficial reuse and dispose of below-ground biomass at a landfill. Smaller individuals of tamarisk may be removed by weed wrench, especially in sandy soils and/or after rainfall.	Minimal potential disturbance to native plants and/or wildlife. Effective if rhizomes and root masses are thoroughly cleared from site. Chipped biomass may be used for mulch or other beneficial purposes. Biomass removal may reduce flooding and fire hazard.	If extensive biomass removal is required, additional time and labor costs may be incurred. Requires thorough extraction of roots/ rhizomes and removal of biomass to be effective. Significant soil disturbance and potential for erosion.
<b>Above-Ground Mechanical Removal</b>	Areas with easy access for mechanical equipment. Where there is concern with herbicide use. Any size stand not intermixed with native plants.	Most effective during the growing season (spring through fall).	Brush grinders, flail mowers, or similar equipment for shredding biomass.	Shred target plants within six inches of the ground. Leave roots and rhizomes in the ground. Leave shredded biomass in place.	Efficient reduction of biomass for large stands. Biomass removal may reduce flooding and fire hazard.	Very low mortality rates require repeated re-treatment (five years or more), increasing project cost and frequency of disturbance to sensitive areas. Need suitable access for equipment.

**Table 8 – Other Target Plant Species Removal Methods (continued)**

Method	Appropriate Use	Timing	Materials and Tools	Instructions	Advantages	Disadvantages
<b>Arundo and/or Tamarisk (continued)</b>						
<b>Above and Below-Ground Mechanical Removal</b>	Areas with easy access for mechanical equipment. Where there is concern with herbicide use. Any size stand not intermixed with native plants.	Any time of year.	Backhoes, excavators, or similar equipment for removing biomass. Pick-axes, mattocks, shovels, “weed wrenches”, or similar equipment for extracting below-ground biomass remnants. Haul trucks or similar equipment to remove cut biomass.	Remove plants and their root systems simultaneously. Dig out any root/rhizome fragments that remain after mechanical removal using hand tools. Dispose of all biomass at a landfill.	Effective if rhizomes and root masses are thoroughly cleared from site. Effective for removing large infestations in open and accessible terrain. Biomass removal may reduce flooding and fire hazard.	Significant soil disturbance and potential for erosion. Potential for collateral impacts to native plants, wildlife, and habitat. Need suitable access for equipment.
<b>Controlled Burning</b>	Large stands not intermixed with native plants. Where there is concern about herbicide use.	Most effective during the growing season. Unlikely to be approved during times of high fire danger.	Flamethrowers, weed burners, or similar equipment. Fuel.	Broadcast burn large stands, spot treat small clusters, or heat-girdle stems at the base of individual plants. For larger controlled burns, fire crews may be required to monitor fires to prevent unintentional spread.	Efficient reduction of biomass for large stands. Biomass removal may reduce flooding and fire hazard.	Requires permits to perform burns. Low mortality rates make it ineffective as sole control method. Large potential for regrowth. Potential for collateral impacts to native plants, wildlife, and habitat. Risk of fire spread to non-intended targets such as structures or buildings. Target species readily recover from fire, allowing them to out-compete native riparian vegetation in post-fire circumstances. Requires appropriate weather conditions.
<b>Controlled Burning and Spray Resprouts</b>	Large stands not intermixed with native plants.	Burning is most effective during growing season. Unlikely to be approved during times of high fire danger. Spring through fall depending on herbicide used.	Flamethrowers, weed burners, or similar equipment for burning. Fuel. Herbicide, surfactant, colorant, and water. Backpack sprayers, spray rigs, or similar equipment for herbicide application.	Broadcast burn large stands, spot treat small clusters, or heat-girdle stems at the base of individual plants. For larger controlled burns, fire crews may be required to monitor fires to prevent unintentional spread. Apply herbicide one to two months after burning to allow for significant resprouting (until resprouts are one to three feet tall).	Efficient reduction of biomass for large stands. Less herbicide needed than with full stands of target plants. Little risk of herbicide drift to non-target plants and wildlife. Biomass removal may reduce flooding and fire hazard.	Requires permits to perform burns. Not appropriate in areas where listed and/or special status species are present. Potential for collateral impacts to native plants, wildlife and habitat. Risk of fire spread to non-intended targets such as structures or buildings. May be public concern with herbicide use. Requires appropriate weather conditions.
<b>Biological Control</b>	Large stands. Stand may be intermixed with native plants.	Dependent upon pathogen or species released.	Dependent upon pathogen or species released.	Introduce pathogen to target species or release insect species on-site, depending on control agent selected. Biological controls are monitored and regulated by the USDA.	May be effective in controlling the spread of tamarisk.	No biological control agent approved for use in the Calleguas Creek watershed for either arundo or tamarisk as of the completion of the Plan. May not be effective in eradicating the target species.

**Table 8 – Other Target Plant Species Removal Methods (continued)**

Method	Appropriate Use	Timing	Materials and Tools	Instructions	Advantages	Disadvantages
<b>Arundo Only</b>						
<b>Tarping</b>	Small stands (<0.25 acres) not intermixed with native plants. Where there is concern about herbicide use.	Tarps applied in late spring/early summer.	Chainsaws, loppers, or similar equipment for cutting biomass. Chippers to reduce biomass of hand-cut vegetation (optional). Haul trucks or similar equipment to remove cut biomass. Opaque thick tarps or pond liners. Stakes or weights.	Cut canes of arundo within six inches of the ground. Chip biomass and place over cut stems/stumps as mulch. Extra chipped biomass may be disposed of at a landfill or reused elsewhere as mulch. Lay tarps or pond liners over the cut material. Secure tarps or pond liners with stakes or weights. Tarps remain on the target area for two years. Tarps should be removed from November through April in flood areas.	High success rate. Available for active channel areas if performed during dry season. Minimal potential disturbance to native plants and/or certain wildlife. Little soil disturbance. Effective on small stands.	Limited by size of stand. May damage soil microorganisms. Not appropriate in active channels. Tarps vulnerable to wind damage, vandalism, and puncturing from cut stems.
<b>Grazing/Herbivory</b>	Large stands not intermixed with native plants. Where there is concern about herbicide use.	Any time of year. Most effective during growing season.	Grazing animals such as goats. Secure, temporary fencing.	Focus grazers on areas with high densities of arundo. May require fencing, herding, or other techniques to ensure that the method is effective and that grazers do not consume native vegetation.	May provide effective temporary control of new arundo growth. Provides animal forage.	Labor and time intensive. Low mortality rates require repeated re-treatment (five years or more), increasing project cost and frequency of disturbance to sensitive areas. May be difficult to focus grazers on target plants. Grazers may not find target species palatable. Concentrated areas of animal waste may cause negative impacts to treatment areas. Not appropriate in active channels.