

# An obsession with Odonata: recognizing, understanding, and sustaining dragonflies & damselflies

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WMSWCD Soil School  
7 April 2018

White-belted Ringtail (*Erythemis compositus*); CASM

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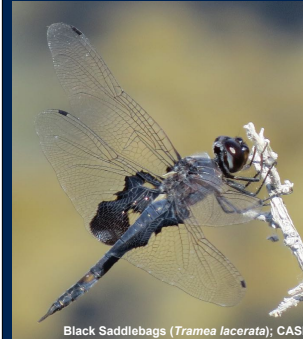
## Meet the odonates



California Spreadwing (*Archilestes californicus*); CASM



damselfly nymph; CASM



Black Saddlebags (*Tramea lacerata*); CASM



Western Forktail (*Ischnura perparva*); CASM



Western Pondhawk (*Erythemis collocata*); CASM

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## Meet the odonates

Odonata ("toothed")

dragonflies (Anisoptera)

damselflies (Zygoptera)

fossil record >400 mya



Western Pondhawk (*Erythemis collocata*); CASM



Petroglyph National Monument



Gila National Forest; USFS

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## Meet the odonates

>5952 species in the world

462 spp. in North America

93 spp. in Oregon

41 spp. in Multnomah Co.,

31 spp. in Washington Co.



Variable Darner (*Aeshna interrupta*); CASM



Sierra Madre Dancer (*Argia lacrimans*); CASM



Dragonlet (*Erythrodiplosis* sp.); CASM

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Cardinal Meadowhawk (*Sympetrum illotum*); CASM



Vivid Dancer (*Argia vivida*), CASM

large body

wider abdomen

eyes touch or nearly so

HW broader than FW

wings horizontal when perched

small body

slender abdomen

eyes separated

equal-sized wings

wings folded when perched

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Bear Creek CA; CASM



Eau Claire River WI; CASM

flowing waters (rivers, creeks, streams, sloughs, ditches)



Whychus Creek OR; CASM



Sandy River OR; CASM

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Doweys Mill Pond, Quechee VT; CASM



RAMSAR wetland, Xalapa Mexico; CASM

still waters (bog, swamp, lake, marsh, wet meadow, seep)



Kristi Lake bog, Saskatchewan Canada; CASM



Sauvie Island, OR; CASM

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skimmer and damselfly nymphs; CASM

stout, jet-propelled  
dragonfly nymphs

internal gill chamber



pond damselfly nymphs; CASM

slender, minnow-like  
damselfly nymphs

external gill lamellae

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stout, jet-propelled  
dragonfly nymphs

slender, minnow-like  
damselfly nymphs



Damselfly  
nymph  
swimming

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predators as nymphs...



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skimmer nymph; Jeff Adams

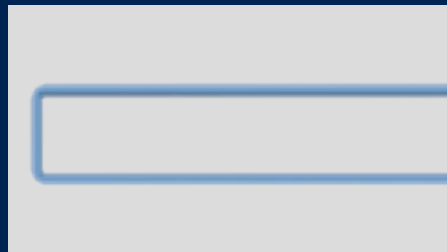
...and as adults

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predators as nymphs...

...and as adults



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nymphs molts through multiple stages (instars)

wing pads develop as nymph grows

adult emerges from "skin" of final instar nymph



skimmer emergence; CASM



skimmer emergence; CASM



skimmer emergence; CASM

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nymphs molts through multiple stages (instars)  
 wing pads develop as nymph grows  
 adult emerges from “skin” of final instar nymph



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color development  
 continues with age

males & females can  
 look very different



Twelve-spotted Skimmer (*Libellula pulchella*); CASM



Vivid Dancer (*Argia vivida*) female; CASM



Twelve-spotted Skimmer (*Libellula pulchella*); CASM



Vivid Dancer (*Argia vivida*) male; CASM

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mating occurs in  
 flight or perched

females lay eggs  
 soon after mating



Common Green Damers (*Anax junius*); CASM

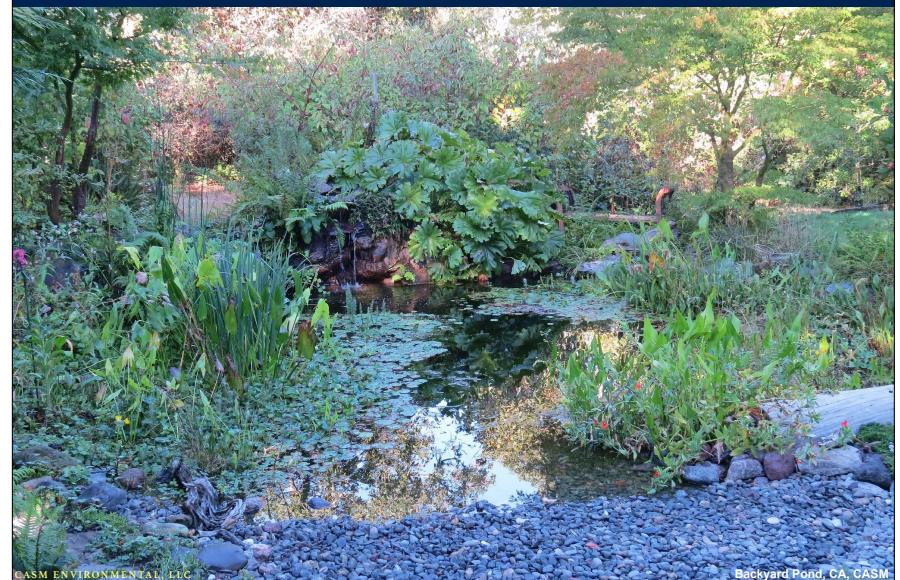


Tule Bluets (*Enallagma carunculatum*); CASM

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Why build a backyard pond?



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Backyard Pond, CA, CASM

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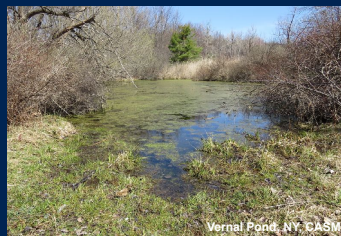


# Why build a backyard pond?

## Wildlife benefits

improve habitat connectivity

provide features missing from local landscape



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# Why build a backyard pond?



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# Why build a backyard pond?



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# Why build a backyard pond?



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## Why build a backyard pond?



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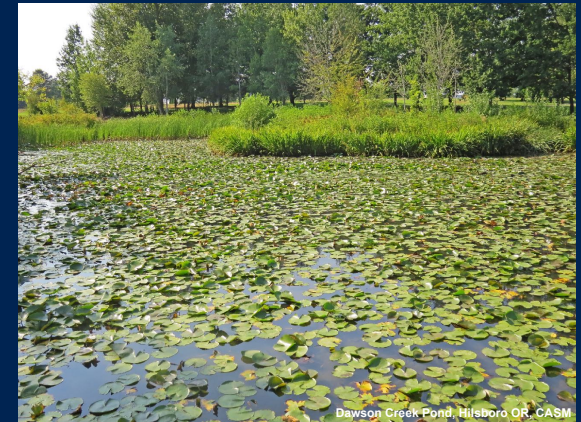
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## Why build a backyard pond?

Human benefits

aesthetics

relaxation



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## Why build a backyard pond?

Human benefits

education

hobbies



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## Odonates & Ponds

Many wetland species  
can breed in created habitats

Moving-water species may visit  
to hunt, mature, or find refuge

Make your pond a source,  
not a sink!



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## Odonates & Ponds

Basic needs:

water

food

vegetation

egg-laying substrate



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## Basic elements

vegetation

submerged, emergent,  
floating, edge, upland

rotting logs



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## Basic elements

vegetation

diverse (type, texture, height)

structural complexity



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## Basic elements

a few large stones & branches at edge



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## Basic elements

upland habitat

feeding, resting, refuge

also habitat for pollinators,  
birds, beneficial insects



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## Pond Construction

avoid large overhanging trees

small trees or shrubs  
at west side can  
provide shade in  
hottest part of day



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## Pond Construction

avoid area that will get a lot of  
runoff

provide overflow channel  
(spillway) if needed

can be piped or natural

monitor to prevent clogging



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## Pond Construction

multiple water depths: shallows for warmth,  
depths for cool refugia & to avoid freezing



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## Pond Construction

deep enough not to freeze solid in winter

2.5 ft (0.8 m) in smaller ponds  
(up to 20 m<sup>2</sup>/215 ft<sup>2</sup>)

4 ft (1.2 m) in  
larger ponds

minimum viable area:  
~40 ft<sup>2</sup> (3.7 m<sup>2</sup>)



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Aquascape

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## Pond Construction

flexible liner: water retention, natural shape



Seattle WA, Dennis Paulson

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## Pond Construction

Call before you dig!

use string or hose to lay out shapes

dig series of steps & shelves

can use sod to create berm;  
sift dirt to lay under liner



Popular Mechanics

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## Pond Construction

pre-formed ponds limit size, shape, depths

can line with 45 mil PVC, polyethylene, butyl rubber,  
or EDPM rubber pond liner

liner length:  
pond length x 2X maximum depth + 1.8 in. (50 cm)

liner width:  
pond width x 2X maximum depth + 1.8 in. (50 cm)

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# Pond Construction

after digging, put down layer of sifted soil,  
damp sand, newspaper

spread out liner &  
smooth out wrinkles

add rock & gravel

fill 1/2 - 2/3 with water



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Additional elements

light-colored rocks  
and/or log at edge

upland plantings



Sonoran Skippers (*Polites sonora*), OR: CASM



Black Soldier Fly (*Hermetia illucens*),  
OR: CASM



Western Painted Turtle, OR: CASM

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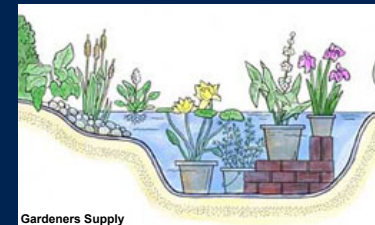
## Planting

50-70% total cover:

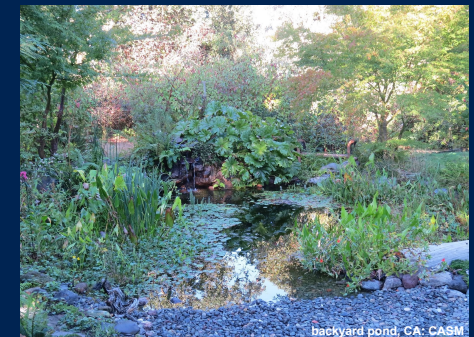
5% emergent;  
10-25% floating;  
25-50% submerged

can set in mesh  
baskets or plant pot

cover soil in pot  
with gravel layer



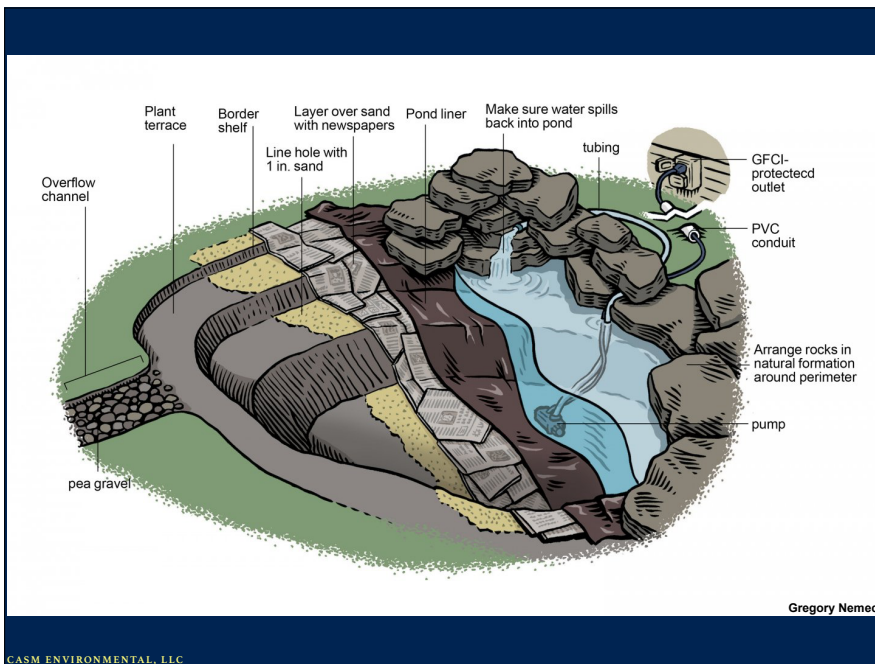
Gardeners Supply



backyard pond, CA: CASM

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Gregory Neme

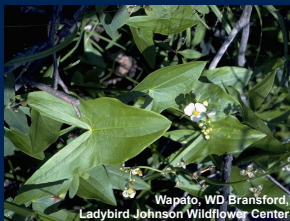
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## Pond plantings:

wapato



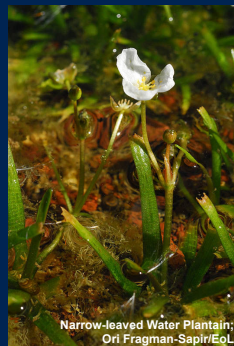
coontail



pacific water parsley



narrow-leaved water plantain



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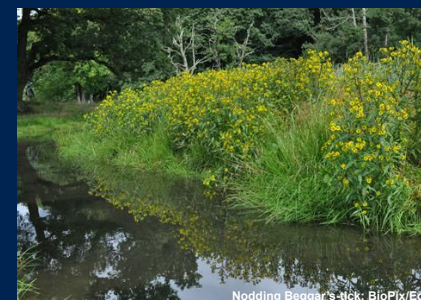
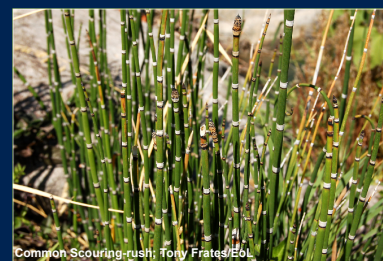
nodding beggar's-tick

slender boykinia

columbia tickseed

common scouring-rush

spikerush



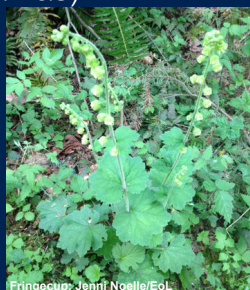
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## marginal plantings

grasses & sedges (slough grass, blue wildrye, dagger-leaf rush, slough sedge, wooly sedge )

forbs (fringe cup, goatsbeard, red columbine, camas)



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shrubs (Nootka rose, swamp rose, red osier dogwood, Pacific Ninebark, Douglas spirea)

trees (Pacific Willow, Scouler Willow, Oregon Ash, Bigleaf maple)



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while plants are small,  
place a few wood or  
bamboo stakes to  
provide emergence  
surface for nymphs



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## Maintenance

water levels

clean out every 2-3 yrs  
as needed:

plants

sediment

invasive species



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## Troubleshooting

### Algae

expect greater abundance Y1

floating & emergent plants will decrease light  
& nutrient levels,  
slow growth of algae

can do manual removal



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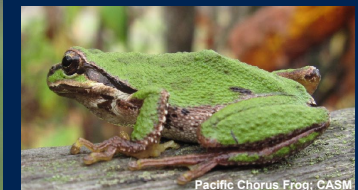
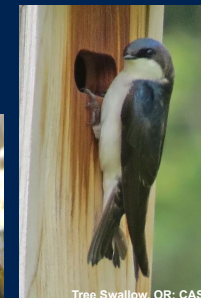
## Troubleshooting

### Mosquitoes

many natural enemies

biological control (Bti)

moving water



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## Questions?

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Spotted Towhee, CASM



Western Swallowtail, CASM



Pacific Chorus Frog, CASM



Western Red Squirrel, CASM

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