PLANTS AND IRRIGATION IN BIORETENTION

Megan W. Stromberg Consulting

ROLE OF PLANTS

Plant roots penetrate soil creating flow paths

Maintain infiltration rate

Exude saccharides and dead material that feed organisms

Create soil aggregates

Nutrient uptake

Metal uptake

Volatilization

Drawback: Short-circuiting

SELECTION OF PLANTS

- Must tolerate poor shallow well-drained soils AND flooding
- Native species preferred
- Provide dense cover and fibrous root structure
- No fertilizer
- Tolerate drip irrigation
- Grasses perform best

TOP PICKS

Native Grasses:

Juncus patens or Juncus effuses (rushes)

Carex barbarae, Carex pansa (sedges)

Muhlenbergia rigens (Deer Grass)

Non-native Grasses:

Chondropetalum tectorum (Small Cape Rush)

Carex divulsa (Berkeley sedge)

TOP PICKS

Perennials:

- Iris douglasiana (Douglas iris)
- Achillea millefolium (Yarrow)
- Frageria chiloensis (strawberry)
- Oenethera hookeri (Hooker's primrose)

TOP PICKS

Shrubs:

- Baccharis pilularis (dwarf or upright coyote brush)
- Artemisia ludoviciana (white sagebrush)
- Mahonia nervosa (dwarf Oregon grape)
- Rosa californica (California rose)

TOP PICKS

Trees:

Trees struggle in bioretention

Work with your local jurisdiction – street tree criteria

Choose small trees that are good for containers: Redbud, Olive, Southern Magnolia, Japanese Maple

WARNING SIGNS

Unhealthy Vegetation

- Sign of drainage problems (too fast)
- Reduced filtration
- Irrigation failure or schedule adjustment
- High infiltration rate = stress

✓Add mulch to improve water retention and adjust irrigation

✓Replant with more drought tolerant plants

WARNING SIGNS: BARE SPOTS

- < 60% cover
- Replant
- Mulch with compost during dry season
- Compost tea, no fertilizer
- Investigate drainage issues, clogging

WARNING SIGNS

Dead Vegetation & Weeds

- Remove thatch when more than 10% cover
- Remove weeds, invasive versus unwanted
- Remove plants blocking inlets/outlets
- Replant if weeds more than 25%
- Dead vs. dormant

WEEDING

Address invasive plants early

- Remove weeds by hand. Pull and dig out roots.
- Remove all weeds and vegetative debris from the facility and dispose of properly (greenwaste)
- Consult UC Davis IPM Guides
- No herbicides allowed

MULCH!!!!

- Reduces weeds
- Regulate soil temperature and moisture
- Add organic matter (?)
- Attenuate heavy metals

MULCH!!!!

Below waterline:
Compost (“aged” coarse mulch) pea gravel, rock, cobble

Above waterline: Wood chip mulch (chipped hardwood or softwood)

Depth: 3-4” max depth

Micro-bark or gorilla hair not recommended (fire)

Add compost each Spring so it can bind with soil

For compost below waterline: press into soil with boots

PROHIBITED MATERIALS

Herbicides
Pesticides
Fertilizer

- Bioretention is directly connected to streams and the Bay
- Bioretention cannot remove herbicides or pesticides
- Excessive nutrients are a pollutant leading to algal blooms, reduces oxygen in water

COMPOST TEA

5 gallons compost tea mixed with 15 gallons water per acre

Once a year max

Apply between March – June

Mild temperatures (between 50 – 90)

No rain for 48 hours in forecast

PEST CONTROL OPTIONS:

The following may be applied for pest control if needed:

- Beneficial nematodes
- “Safer” Products
- Neem Oil
- Check UCIPM database

MAINTAINING PLANT HEALTH: JUNCUS (RUSHES)

- Does not benefit from cutting back regularly
- If pruning: comb through, clip at base.
- Do not prune to a ball. Impenetrable to new growth.
- Every 3-4 years, prune to 1” in Fall/winter only, vulnerable to heat when pruned

MAINTAINING PLANTS: DEER GRASS

Thrives on minimal care

2-3 years thatch builds up

Cut back only slumping plants in **late winter** to 6” height

Other smaller species of bunch grasses can be cut to 3”

MAINTAINING PLANT HEALTH: PERENNIALS

- More sensitive to flooding than grasses
- **Deadheading** or cut off spent flower stocks at base after blooming cycle or early fall
- **Divide roots** to refresh during winter every 3-5 years
- **Winter pruning**: Many species can be cut to 2-3” every 2-3 years to refresh
- Google it to find out if it can be refreshed before giving up

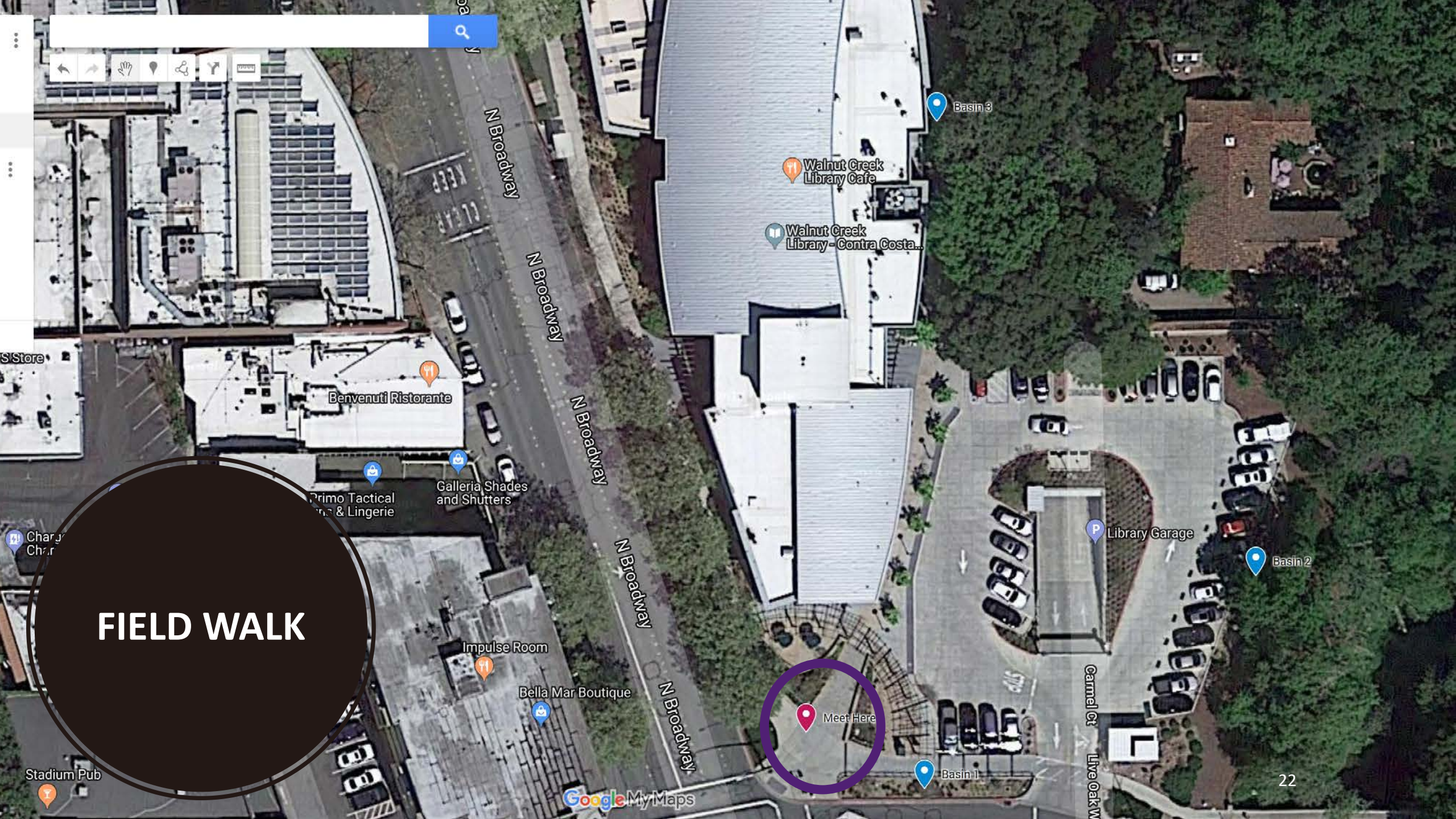
MAINTAINING PLANT HEALTH: SHRUBS/TREES

- Ideally shrubs are not too large for basin
- Pruning: Use sharp clean tools
- Remove dead wood first, crossing branches
- Work slowly, selective pruning is best
- Remove whole branch where it meets another major branch
- Shearing is generally bad for most natives

IRRIGATION

- Little difference in maintenance from regular landscapes.
- Avoid overwatering – potable water is not good for streams.
- Many systems are subsurface drip

- Inspect the system components for breaks, leaks and blockages and repair them as needed
- Inspect while system is running
- Adjust the system to prevent overspray outside the facility.


FIELD WALK
N Broadway
Basin 3
Walnut Creek Library Cafe
Walnut Creek Library - Contra Costa...
Benvenuti Ristorante
Galleria Shades and Shutters
Primo Tactical
& Lingerie
Library Garage
Basin 2
Impulse Room
Bella Mar Boutique
Meet Here
Basin 1
Carmel Ct
Stadium Pub
Google My Maps