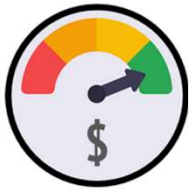
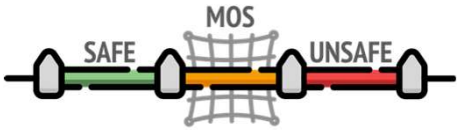
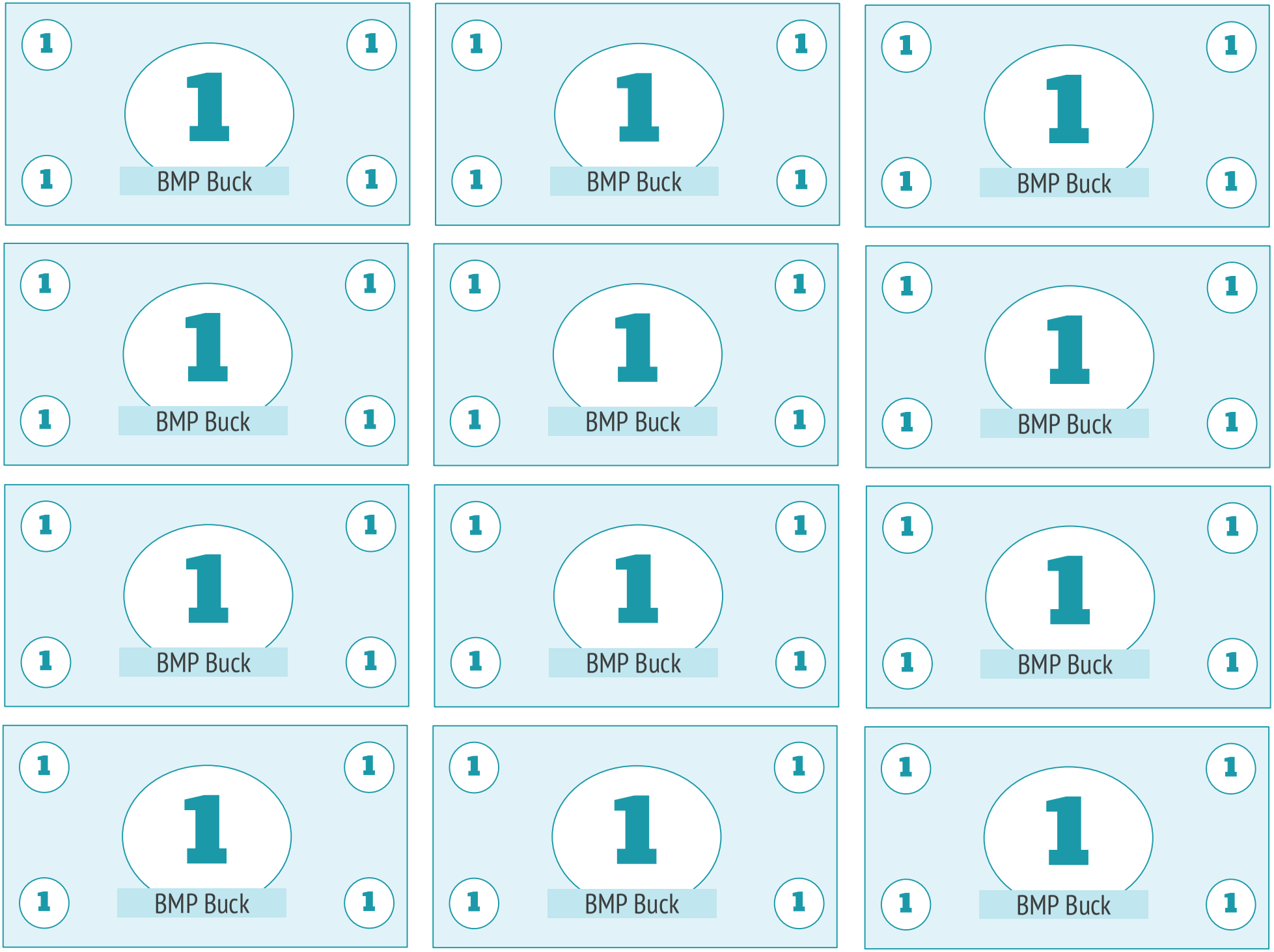
Comparison of TMDL and Personal Budgeting

TMDL PLANNING (WATER QUALITY)	PERSONAL BUDGETING (FINANCE)
1. Identifying Impairment 	 1. Lifestyle Needs
2. Desired Condition 	 2. Total Budget
3. Margin of Safety 	 3. Emergency Funds
4. Dividing Responsibility 	 4. Expenditure Categories
5. Tracking Success 	 5. Budget Review

NOTE: This graphic has been designed using resources from Flaticon.com


1
BMP Buck

BMP Marketplace Reference

BMP	Cost (Bucks)	TSS Reductions (Beads)	Nutrient Reductions (Beads)	Efficiency Rating
Planter Box	1	2	1	High (TSS & N focus)
Rainwater Harvesting (Rain Barrel)	1	2	1	High (Roofs & Cisterns)
Rain Garden (Bioretention)	2	4	3	Very High (Generalist)
Bioswale (Vegetated Swale)	2	3	2	High (Linear Flow)
Urban Forestry & Tree Boxes	2	2	2	Moderate (Infiltration)
Porous Pavement	3	4	2	Very High (Heavy Foot/Vehicular)
Detention Basin (Dry Pond)	3	3	1	Moderate (Settling)
Retention Basin (Wet Pond)	3	2	1	Moderate (Wet Storage)
Green Roof / Green Wall	3	3	0	Low-Muted (Rooftops)

Balanced Landowner Target Profiles

Landowner Group	Land Cover Type	Budget	Starting Debits (TSS / N)	Credit Targets (TSS / N)	Optimized Combination
Administration for Mock Site	30 ac (Urban)	6 Bucks	12 TSS / 8 N	10 TSS / 7 N (85%)	Pavers (3) + Rain Garden (2) + Rain Barrel (1)
State of Hawai‘i Highways	300 ac (Urban)	12 Bucks	20 TSS / 13 N	17 TSS / 11 N (85%)	Pavers + Rain Garden + Swale + Planter + Barrel
Waikele Public Land Trust	1200 ac (Cons)	10 Bucks	16 TSS / 11 N	13 TSS / 9 N (81%)	Rain Garden + Bioswale + Planter + Rain Barrel
Hawai‘i Agriculture Specialists	600 ac (Ag)	14 Bucks	24 TSS / 14 N	20 TSS / 12 N (84%)	Pavers + Detention + Rain Garden + Swale + Planter + Barrel

LAND OWNER SCORECARD – 1

Print and cut out.

LANDOWNER: Administration for Mock Site

Profile: 30 ac (Urban Campus / Residential Mix) | **Budget:** 6 Bucks | **Starting Debits:** 12 TSS, 8 N | **Credit Targets:** 10 TSS, 7 N

Selected BMP (Unique Only)	Cost (Bucks)	TSS Reduced (Beads)	Nutrients Reduced (Beads)	Teacher Initial
1.				
2.				
3.				
4.				
5.				
TOTALS ACHIEVED:	Sum: _/ 6 Bucks	Sum: _/ 10 TSS	Sum: _/ 7 N	Target Met? [ ]

LANDOWNER: State of Hawai‘i Highways

Profile: 300 ac (100% Urban roadways & medians) | **Budget:** 12 Bucks | **Starting Debits:** 20 TSS, 13 N | **Credit Targets:** 17 TSS, 11 N

Selected BMP (Unique Only)	Cost (Bucks)	TSS Reduced (Beads)	Nutrients Reduced (Beads)	Teacher Initial
1.				
2.				
3.				
4.				
5.				
TOTALS ACHIEVED:	Sum: __/ 12 Bucks	Sum: ___/ 17 TSS	Sum: ____/ 11 N	Target Met? [ ]

LAND OWNER SCORECARD – 2

Print and cut out.

LANDOWNER: Waikele Public Land Trust, LLC

Profile: 1200 ac (Conservation & forested trails) | **Budget:** 10 Bucks | **Starting Debits:** 16 TSS, 11 N | **Credit Targets:** 13 TSS, 9 N

Selected BMP (Unique Only)	Cost (Bucks)	TSS Reduced (Beads)	Nutrients Reduced (Beads)	Teacher Initial
1.				
2.				
3.				
4.				
5.				
TOTALS ACHIEVED:	Sum: _/ 10 Bucks	Sum: ___/ 13 TSS	Sum: ____/ 9 N	Target Met? [ ]

LANDOWNER: Hawai‘i Agriculture Specialists, Inc.

Profile: 600 ac (Crops & agricultural lands) | **Budget:** 14 Bucks | **Starting Debits:** 24 TSS, 14 N | **Credit Targets:** 20 TSS, 12 N

Selected BMP (Unique Only)	Cost (Bucks)	TSS Reduced (Beads)	Nutrients Reduced (Beads)	Teacher Initial
1.				
2.				
3.				
4.				
5.				
TOTALS ACHIEVED:	Sum: _/ 14 Bucks	Sum: ___/ 20 TSS	Sum: ___/ 12 N	Target Met? [ ]

Bioswale, Vegetated Swale, or Grassed Swale

BMP Bills: 2

What is it?

- Planted, shallow, linear and gently sloped channels that slow the flow of storm water to promote absorption, infiltration, and filtration.

Performance Score Matrix

$ Affordability	Installation	Maintenance	Effectiveness
3	3	4	3

Activity-Related Statistics

- Bead Removal
  - Nutrients: 2
  - Sediment: 3
- Volume Reduction: 50%
- Location suitability

  Parking lot perimeters, urban roadway rights-of-way, industrial parks, and low-density commercial zones

Pros	Cons
✔ Requires minimal elevation change Design Note: Use low-nutrient soil mixes & maintenance to limit nutrient runoff.	✖ Requires sufficient sunlight & well-draining soil ✖ Erosion from high-velocity flows & poor vegetated growth

Detention Basin or Dry Pond

BMP Bills: 3

What is it?

- Temporarily stores storm water runoff to allow particles to settle. Gradually releases water and is designed to drain completely between storms.

Performance Score Matrix

$ Affordability	Installation	Maintenance	Effectiveness
2	1	4	2

Activity-Related Statistics

- Bead Removal
  - Nutrients: 1
  - Sediment: 3
- Volume Reduction: 5%
- Location suitability

  Large commercial developments with sandy soils

Pros	Cons
✔ Flood Control ✔ Removal of a variety of pollutants	✖ Not for areas with a high water table ✖ Public safety concerns when full

BMP Cards - 2
Print and cut out.

Green Roof or Wall

BMP Bills: 3

What is it?

- Plant- and soil-covered building surfaces that absorb, filter, and evaporate rainfall.

Performance Score Matrix

Affordability	Installation	Maintenance	Effectiveness
2	1	2	2

Activity-Related Statistics

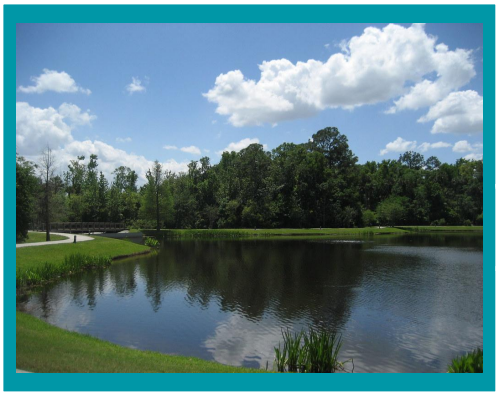
- Bead Removal
  - Nutrients: 0
  - Sediment: 3
- Volume Reduction: 65%
- Location suitability

  High-density commercial districts, downtown cores, flat-roofed high-rises, and dense plazas.

Pros	Cons
✔ Requires little land area	✖ Requires strong structural support
✔ Sound and thermal barrier for the building	✖ May cause damage from water exposure if not properly maintained
✔ Enhances area aesthetics	✖ Cannot be installed on steep sloped roofs

Retention & Infiltration Basin, or Wet Pond

BMP Bills: 3



What is it?

- Basins that collect and retain rainwater to capture, store, filter, and infiltrate it.

Performance Score Matrix

Affordability	Installation	Maintenance	Effectiveness
2	1	2	3

Activity-Related Statistics

- Bead Removal
  - Nutrients: 1
  - Sediment: 2
- Volume Reduction: 65%
- Location suitability

  Master planned communities, areas with large footprints

Pros	Cons
✔ Reduces flooding and downstream erosion	✖ Requires specific soil drainage
✔ Enhances area aesthetics	✖ Requires public safety measures
✔ Can be used in areas with high water tables	✖ Can breed mosquitoes

BMP Cards - 3
Print and cut out.

Planter Box

BMP Bills: 1

What is it?

- Concrete-lined boxes containing gravel, soil, and vegetation to infiltrate storm water runoff.

Performance Score Matrix

Affordability	Installation	Maintenance	Effectiveness
3	3	3	3

Activity-Related Statistics

- Bead Removal
  - Nutrients: 1
  - Sediment: 2
- Volume Reduction: 55%
- Location suitability

  Tight urban streetscapes and sidewalk borders

Pros	Cons
✔ Minimal land area requirements ✔ Enhances area aesthetics	✖ Requires well draining soil

Porous, Pervious, & Permeable Pavement

BMP Bills: 3

What is it?

- Paving materials that allow storm water to pass through and absorb into the soil underneath.

Performance Score Matrix

Affordability	Installation	Maintenance	Effectiveness
2	2	4	4

Activity-Related Statistics

- Bead Removal
  - Nutrients: 2
  - Sediment: 4
- Volume Reduction: 80%
- Location suitability

  Parking lots, low-traffic alleys, driveways

Pros	Cons
✔ Reduces roadway flooding ✔ Can replace existing pavement, requiring no added land area	✖ Must be cleaned to prevent clogging ✖ Not suitable in heavy-traffic, high speed, or steep sloped areas

BMP Cards - 4
Print and cut out.

Rain Garden or Bioretention Basin

BMP Bills: 2

What is it?

- Vegetated, shallow depressions that collect and filter rainwater.

Performance Score Matrix

Affordability	Installation	Maintenance	Effectiveness
3	3	4	5

Activity-Related Statistics

- Bead Removal
  - Nutrients: 3
  - Sediment: 4
- Volume Reduction: 80%
- Location suitability

  Residential yards, parking lot islands, parks, landscaped office fronts

Pros	Cons
✔ Enhances area aesthetics ✔ Reduces localized ponding	✖ Requires sun to support vegetation ✖ Requires specific vegetation for area conditions and frequent water inundation ✖ Requires terracing for steep slopes

Rain Harvesting or Rain Barrels

BMP Bills: 1

What is it?

- Methods of capturing storm water runoff using containers for non-potable reuse.

Performance Score Matrix

Affordability	Installation	Maintenance	Effectiveness
4	3	3	1

Activity-Related Statistics

- Bead Removal
  - Nutrients: 1
  - Sediment: 2
- Volume Reduction: 60%
- Location suitability

  Roof downspouts (water used for nearby irrigation/flushing)

Pros	Cons
✔ Alternative non-potable water source ✔ Minimal space required ✔ Easy install to existing structures	✖ Limited storage capacity ✖ Can cause mosquito issues ✖ Stored water must be used frequently to be effective