Stormwater Impact Assessments

Connecting primary, secondary and cumulative impacts to Hawaii's Environmental Review Process

TRAINING

June 4, 2013

Hilo

Presented by

PBR HAWAII

Agenda

9:00 – 9:10	Introductions
9:10 – 9:15	Background
9:15 – 9:20	Introduction of Five-Step Framework
9:20 – 9:50	Step 1: Gather pertinent data
9:50- 10:15	Step 2: Determine appropriate level of analysis
10:15 – 10:25	BREAK
10:25 – 10:55	Step 3: Analyze data in light of proposed project
10:55 – 11:20	Step 4: Identify mitigation goals & measures
11:20 – 11:25	BREAK
11:25 – 11:35	Step 5: Summarize impacts and mitigation measures
11:35 – 11:45	Review checklist – Exercise
11:45 – 12:00	Conclusion & Questions

Background

- Guidance document purpose & need

> *"Cumulative effects assessment is neither well understood nor well implemented and is not integrated with the planning process"*
> (University of Hawai'i, 2010)

Question 1

Principles

- Clarifying how stormwater impact assessment **relates to the environmental review process**
- Acknowledging how stormwater characteristics in Hawaii's varied environments may **differ from mainland conditions**
- Incorporating **Best Management Practices** and **creative offsite practices** as mitigation measures that can be translated to permit conditions

Primary & Secondary Impacts

Primary (Direct)

- Occur at **same time** & **place** as cause
- Effects on **project site**
- Pertinent factors:
  - bare soil
  - impervious surface
  - nutrient load
  - peak flow

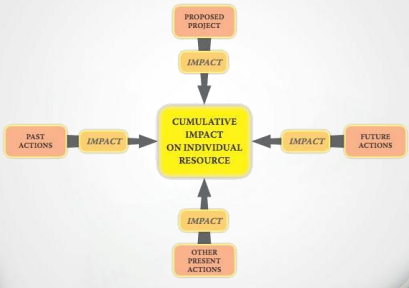
Secondary

- Occur **later in time** or **removed in distance** but reasonably **foreseeable**
- **Offsite** and **down gradient** from project
- Examples:
  - growth-inducing effects
  - ↑ sediment in down stream water body

Cumulative Impacts

- Results from **incremental impact** of the action when **added to past, present, and reasonably foreseeable future actions**
- Occurs **within boundaries of a watershed**

Cumulative Impacts



Question 2

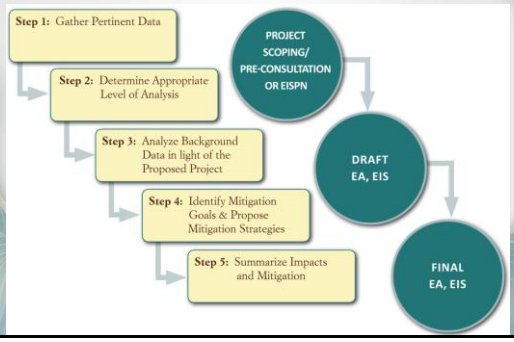
Relationship to State Planning Policies

- Hawaii State Plan Goal (HRS § 226-4 (2))
- Hawaii State Plan Priority Guideline (HRS §226-108)
- Federal Coastal Zone Management Act (HRS §205A-2)
- Significance Criteria (HAR §11-200-12)

Five-Step Framework

1. Gather pertinent data
2. Determine appropriate level of analysis
3. Analyze background information in light of proposed project
4. Identify mitigation goals & propose mitigation concepts
5. Summarize impacts & mitigation

Where does this framework fit in to the EIS process?



Five-Step Framework

1. **Gather pertinent data**
2. Determine appropriate level of analysis
3. Analyze background information in light of proposed project
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5. Summarize impacts & mitigation

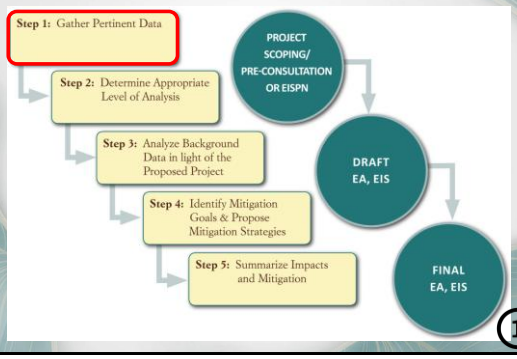
Step 1: Gather pertinent data

Objective: Collect & document pertinent data about existing site & watershed conditions

Methodology: Use best available data and early consultation to document site and watershed hydrology, stressors and sensitivity. Document anticipated stormwater permit requirements as well as management programs that pertain to site and watershed resources.

①

Where does this step fit in?



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Step 1: Gather pertinent data

"How much and where does the water flow?" (hydrology)

"What are the potential sources of water pollutants?" ("stressors")

"How resilient are the down gradient resources to pollutants?" ("sensitivity")

1

How much & where does the water flow?

1

What are the potential sources of water pollutants?

1

How resilient are the down gradient resources to pollutants?

1

Hawaii County Grading Permits

Hawaii County Code Chapter 10

- Exclusions to permit (HCC §10-3)
- Erosion & sediment control measures (HCC §10-18→10-23)
  - Height
  - Cut slopes
  - Fill slopes
  - Distance from property line
  - Area opened
  - Fill material
  - Preparation of ground surface
  - Placement & compaction
  - Vegetation
  - Drainage provisions

Exclusions to Permit

HCC §10-3

- Mining or quarrying operations
- Basements, footings, etc. of building authorized by valid permit
- Individual cemetery plots
- Sanitary filling and operation of dumps
- Exploratory excavations < 50 yd^3

Exclusions to Permit

HCC §10-3

- Agricultural operations in conformance with soil conservation practices and in accordance with an actively pursued comprehensive conservation program
- Trenching & backfilling for utility and drainage conduits
- Clearing, excavation, and filling req'd for installation of pole lines

Limited Exclusion to Permit

HCC §10-3(6) & (7)

- Excavation or fill < 100 yd^3 and < 5 ft. vertical height at its highest/deepest point
  - Must follow cut slopes/fill slopes and distance to property line requirements

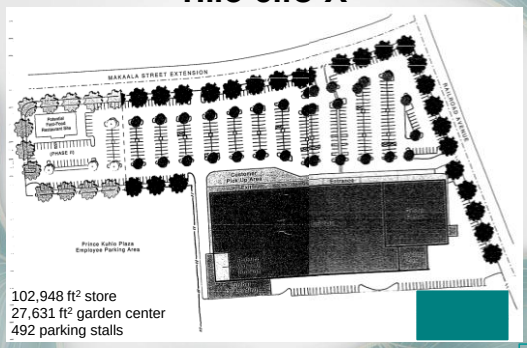
EXERCISE – STEP 1

Hilo Site X

Site = 12 acres Watershed = 11,783 acres

Hilo Site X

Hilo Site X



102,948 ft² store
27,631 ft² garden center
492 parking stalls

Step 1 – Hydrology

How much & where does the water flow?

Existing land use/cover:

Step 1 – Hydrology

How much & where does the water flow?

Soil type:

- Soil is minimal
- Lava flows - bare a'a
- Ka'u Basalt – consists of lava flows, vent deposits, littoral deposits, tephra fall, deposits of tholeiitic basalt
- Pāpa'i Extremely Stony Muck – well drained, thin, extremely stony organic soils over fragmented a'a lava

Step 1 – Hydrology

How much & where does the water flow?

Drainage pattern: Site?

Watershed?

Step 1 – Hydrology

How much & where does the water flow?

Wetlands or embayments?

Receiving waterbodies:

Step 1 – Hydrology

How much & where does the water flow?

Slope & topography:

- Almost level
- Elevation of 83 ft. above msl

Step 1 – Hydrology

How much & where does the water flow?

Flooding hazard:

- FIRM Zone X
- Outside 500-yr flood plain

Annual rainfall and seasonal distribution:

- 125-150-inches per year
- 3.03-inches per hour for 10-year storm
- 3.87 inches per hour for 50-year storm
- Mostly during winter storm season

Step 1 – Hydrology

How much & where does the water flow?

Evapotranspiration & interception factors:

- existing vegetation
- evaporation rates

Step 1 – Hydrology

How much & where does the water flow?

State LUD: Urban

County General Plan: High Density Urban

Zoning: ML-20 Limited Industrial District

Aquifer: Hilo aquifer – basal, unconfined, flank type; highly vulnerable

Existing infrastructure: None

Step 1 – Stressors

What are the potential sources of water pollutants?

303(d) waterbodies? Yes – Hilo Bay

Waterbody classification:

- Inland waters – Class 2
- Marine waters – Class A
  - Waiākea Pond – Class AA

Step 1 – Sensitivity

How resilient are down gradient resources to pollutants?

Potentially impacted resources:

- Aquatic?
- Riparian?
- Cultural?
- Recreational?
- Agricultural?
- Aquifer?

Step 1 – Sensitivity

How resilient are down gradient resources to pollutants?

Management considerations:

- Marine Reserves?
- State WQ standards?
- Protected Coral Reefs?
- Presence of Endangered Species?

Five-Step Framework

1. Gather pertinent data
2. **Determine appropriate level of analysis**
3. Analyze background information in light of proposed project
4. Identify mitigation goals & propose mitigation concepts
5. Summarize impacts & mitigation

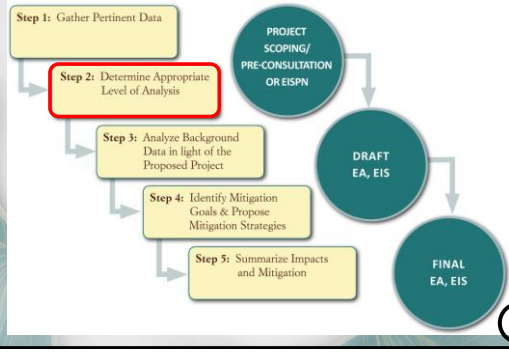
Step 2: Determine appropriate level of analysis

Objective: Determine what level of analysis is sufficient to give stormwater concerns appropriate consideration in the planning phase.

Methodology: Stormwater volume generated on site. Does the stressors + sensitivity + intensity = need for an estimate of volume of pollutants?

2

Where does this step fit in?



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Analysis Considerations

Watershed impairment/stressors

Watershed sensitivity

Development intensity

2

EXERCISE – STEP 2

Step 2 – Watershed Impairment/Stressors

Has a TMDL been established for any stream segment in the sub-watershed or for the receiving waterbody?

Is there an impaired stream or waterbody in the sub-watershed that is classified as category 5 under §303(d) of the Clean Water Act?

Step 2 – Watershed Impairment/Stressors

Is there an impaired stream or waterbody in the sub-watershed that is classified as category 4a, 4b, 4c, or 3 under §303(d) of the Clean Water Act?

Step 2 – Watershed Sensitivity

Is the receiving waterbody:

- Designated Class 1 or Class AA?
- Subject to Hawaii's Local Action Strategy to Address Land Based Pollution Threats to Coral Reefs?
- Identified as sensitive on Hawaii Watershed Priority Project?

Step 2 – Watershed Sensitivity

Do site conditions or combination of site conditions lend themselves to excessive runoff?

Step 2 – Development Intensity

Is the site located in a small urban watershed or sub-watershed (measuring no more than 1 square mile in area and anywhere between 25% and 100% impervious surfaces)?

Step 2 – Development Intensity

Is the action subject to an NPDES permit?

Is LEED® certification desired?

Is the action subject to a County Grading, Grubbing, Tree removal or Erosion and Sediment Control Permit?

Step 2 – Summary

- Sufficient to prepare for applicable NPDES and grading req's
- Consider an analysis that estimates the pre- and post-development **runoff volume** and **volume of pollutants** in the runoff pre- and post-development. (Hawai'i priority watershed)
- Consider conducting a **quantitative analysis** using the "Simple Method" and national pollutant coefficients to calculate potential post-development pollutant loads.

Five-Step Framework

1. Gather pertinent data
2. Determine appropriate level of analysis
3. **Analyze background information in light of proposed project**
4. Identify mitigation goals & propose mitigation concepts
5. Summarize impacts & mitigation

Step 3: Analyze background information in light of the proposed action

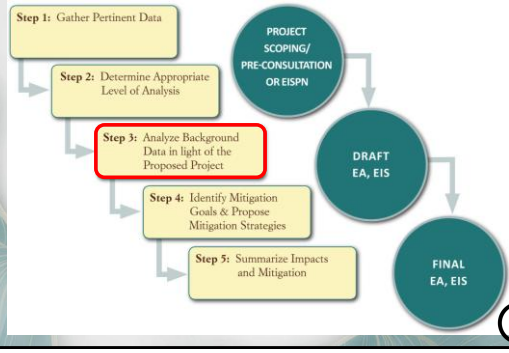
3a. Analyze primary (direct) impacts at the project scale

3b. Secondary impacts (offsite, down gradient)

3c. Cumulative impacts

3

Where does this step fit in?



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Step 3a: Primary impacts

Objective: Discuss impacts & proposed mitigation during construction.

Discuss anticipated direct impacts from the proposed action

3

Step 3a: Primary impacts

- Construction impacts
  - NPDES permit?
  - Grading permit?
- Pre- vs. Post-development Long-term impacts

Image source: www.bluewaterbaltimore.org

3

Step 3b: Secondary impacts

Objective: The analysis of secondary impacts should assess:

- Potential for down gradient flooding
- Impacts to down gradient sensitive resources

Image source: NOAA Restoration Center

3

Step 3c: Cumulative impacts

Objective: The analysis of cumulative impacts should assess the impacts on sensitive resources from all parts of the watershed relative to existing conditions and potential buildout.

3

Step 3c: Cumulative impacts

Methodology: Minimum planning-level assessment

- Assess existing status of sensitive resources
  - Discuss past actions
  - Discuss present actions
  - Discuss reasonably foreseeable future impacts

3

Step 3c: Cumulative impacts

Methodology: Small, urban watershed assessment

- Assess existing buildout relative to potential buildout
  - Existing impervious area
  - State LUD "Urban" as indicator of future imperviousness

3

Step 3c: Cumulative impacts

Methodology: Watershed modeling for unique circumstances

- Necessity determined in Step 2
- Review for appropriate calculations and summarized results

3

Question 3

EXERCISE – STEP 3

Five-Step Framework

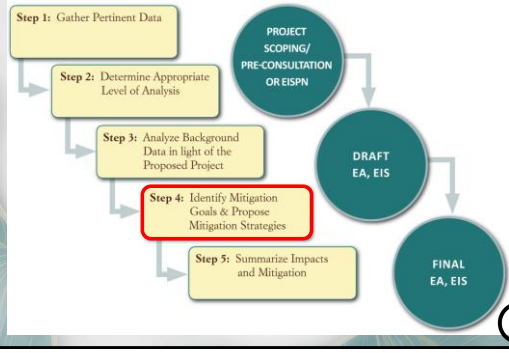
1. Gather pertinent data
2. Determine appropriate level of analysis
3. Analyze background information in light of proposed project
4. **Identify mitigation goals & propose mitigation concepts**
5. Summarize impacts & mitigation

Step 4: Identify mitigation goals & propose mitigation strategies

Objective: Integrate the primary, secondary, and cumulative impacts to determine the desired extent of mitigation, while considering site and watershed conditions to formulate mitigation strategies.

4

Where does this step fit in?



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Identify mitigation goals

- Robust enough to support a FONSI
- Anticipate required permits
- Acknowledge role of engineering in design development

Clear in concept, but not overly prescriptive!

4

Identify mitigation goals

Mitigation performance criteria

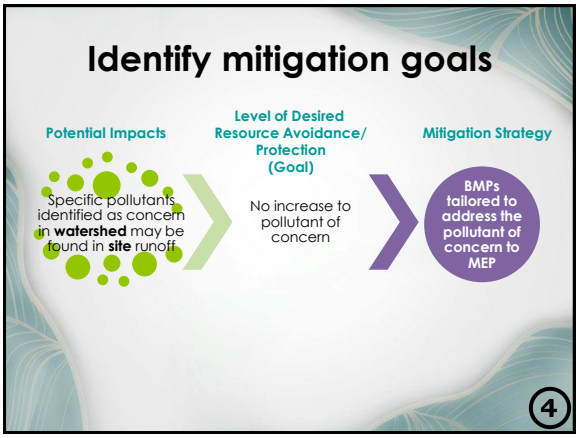
- Maximum extent practicable
- Best available technology
- Range of outcomes

4

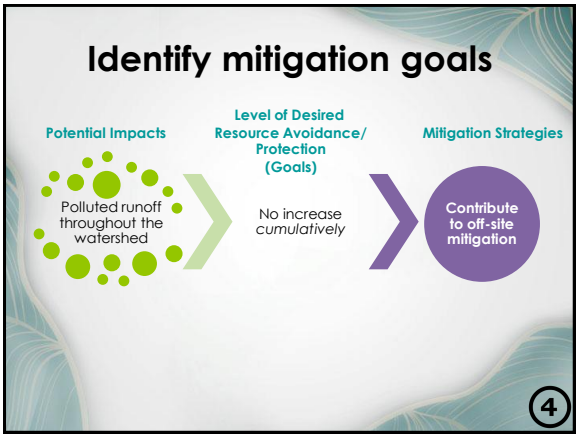
Identify mitigation goals

4

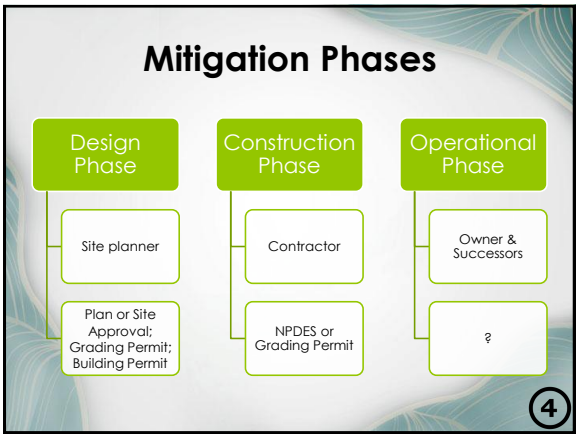
Identify mitigation goals



Identify mitigation goals



Mitigation Phases



Question 4

BMP Strategy Considerations

- Low Impact Development Concepts
- LEED© Standards
- Innovative
- Permanent vs. Temporary

4

EXERCISE – STEP 4

Five-Step Framework

1. Gather pertinent data
2. Determine appropriate level of analysis
3. Analyze background information in light of proposed project
4. Identify mitigation goals & propose mitigation concepts
5. **Summarize impacts & mitigation**

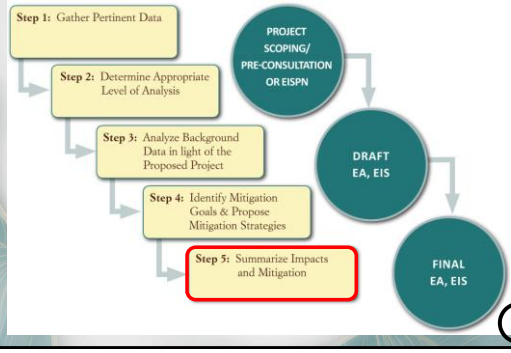
Step 5: Summarize impacts & mitigation applicable to project

Objective: Documentation of impacts, mitigation measures and their projected results.

Methodology: The Draft EA or EIS should summarize all anticipated impacts as described in HAR §200-11(I.) as well as proposed mitigation strategy as described in HAR §200-11(M.)

5

Where does this step fit in?



5

Reviewer's Checklist Exercise

- Using the Reviewer's Checklist in Appendix C, analyze the provided example for completeness.

Thank you!

Time for questions or comments

MAHALO!

The Guidance Document and Training prepared for the Hawaii Office of Planning, Coastal Zone Management Program by:

PBR HAWAII

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