Department of
Transport

Coastal Infrastructure

How to photo monitor beaches

September 2012

Number of photo monitoring points

Consider the following information:

- As a minimum there should be a monitoring point at the northern and southern extent of the beach.
- If the FOV from the northern and southern monitoring points do not capture the entire beach establish a monitoring point in the centre of the beach.
- Create additional monitoring points if a minimum of two monitoring points does not capture the entire beach in the photo.
- For engineered coasts there should be an additional FOV along the structure being monitored.
- Additional reference points should be included where there are assets and infrastructure immediately behind the beach zone.
- The recommended distance between photo monitoring points is dependant on beach type, beach length and presence of coastal protection features. A rough guide would be:

    sandy beach - monitoring points should be approximately 200-500m apart;

    embayed rocky coast - establish monitoring point at each headland and in the centre of the embayment. If additional monitoring points are required space them 200-500m apart;

    straight rocky coast - monitoring points should be approximately 200-500m apart;

    engineered coast - monitoring points should be approximately 200-500m apart excluding photos taken of the structure.

Taking the photos

When taking photos:

- Locate the photo monitoring points and take a photo with the specified FOV
- The date and time of the photos must be recorded (captured on the image if possible)
- Generally, take photos between 9am and 3pm (to minimise sun glint off the water) and at low tide if possible
- If aerial images are being collected, take a set of field photos at the same time as the aerial images
- If possible record site observations and some brief observations about any noticeable beach characteristics, e.g. erosion scarp at the back of the beach.

How frequent?

The frequency of photo monitoring is dependant on the rate of change of coastal processes and weather conditions. The goal of monitoring is to capture the level of variation in the coastal landscape at a seasonal scale and any major event. As a guide:

- Monitoring should be undertaken monthly in summer and fortnightly in winter for 12 months
- It is ideal to monitor before and after severe weather events i.e. storms and flooding. Taking photos immediately after a severe weather event should be given priority
- Frequency should reflect the value of assets; high value assets may require more frequent monitoring
- A beach of less interest can be monitored less frequently, perhaps quarterly or even annually.

Archiving

Upload photos into a database.

The following naming convention and file storage is recommended:

- Album folder - named by site e.g. Busselton Town Beach
- Within album, series of folders named by monitoring point & FOV e.g. Busselton Town Beach FOV 1
- Within monitoring point folder upload all photos for specified FOV. They will automatically be stored by date and time.

Burn photos onto a disc every three to six months and provide them to the DoT for archiving.

The key requirements of a database for beach monitoring photos are:

- High capacity of data storage
- Capacity to upload and view photos
- One account accessible to all participants in the monitoring program
- Photos can be viewed in chronological order for a single FOV
- Photos can be placed and viewed on an interactive map in chronological order
- Albums can be downloaded as a zipped file that has the same file storage configuration as the database
- Mechanism to upload observations of site conditions recorded when photos were taken.

Type 1: Sandy beach - Mullaloo Beach

Site	Location Monitoring Point	Field of View Description
	Top of the first tier of the rocky headland at the northern end (Mullaloo Point) of the beach (see reference point photo for exact location)	a) Line up left side of FOV to see dune north of car park/footpath entrance to beach b) the right side of the FOV to include the water line and ocean
	Pole at path entrance to beach from Korella Street (see reference point photo for exact location)	a) Northwards FOV with left side looking seaward perpendicular to shore b) Southwards FOV with right side looking seaward perpendicular to shore
	Pole at path entrance to beach from Mullaloo SLSC access ways (see reference point photo for exact location)	a) Northwards FOV with left side looking seaward perpendicular to shore b) Southwards FOV with right side looking seaward perpendicular to shore

Table 2: Guidance on location of monitoring points and FOV for rocky coast

Type	Beach Type	Location of Monitoring Points (MP)	FOV Guidance
2	Rocky coast - embayed beach	• Elevated MP at north and south boundary of embayment • Elevated MP at the back of the beach in the centre of embayment (e.g. at footpath or road level)	• Boundary photo - area between frontal dune/cliff face to water line • Photo from central point - edge of both headlands and beach to water line • If FOV does not capture all of the embayment take 2 photos • Two photos from central point - up coast and down coast with the line perpendicular to the beach as the central reference to edge of headland
	Rocky coast - straight cliffed coast	• The MP should be set up as for sandy beaches	• The FOV should be as is for sandy beaches

Next page shows an example of established monitoring points and FOV for an embayed rocky beach.

Type 2: Rocky coast – Trigg to Sorrento

Site	Location Monitoring Point	Field of View Description
	a) Top of the first tier of the rocky headland at the northern end of the area of interest b) Top of a fence post or wall section adjacent to the footpath above the central part of the beach on West Coast Hwy	a) FOV is along the water line and the left side of the FOV should include the back area of the embayment b) FOV is perpendicular to the beach (out to sea) from the elevated shoreward position that can fit both ends of the embayment in the photo
	a) Top of the first tier of the rocky headland at the northern end of the second embayment b) Top of a fence post or wall section adjacent to the footpath above the central part of the beach (at Bailey Street)	a) FOV is along the water line and the left side of the FOV should include the back area of the embayment b) FOV is perpendicular to the beach from the elevated shoreward position that can fit both ends of the embayment in the photo
	a) Top of the first tier of the rocky headland at the northern end of the third embayment b) Top of a fence post from the end of the Bennion Street beach car park that is above the central part of the beach	a) FOV is along the water line and the left right side of the FOV should include the back area of the embayment b) FOV is perpendicular to the beach from the elevated shoreward position that can fit both ends of the embayment in the photo
	a) Top of the first tier of the rocky headland at the northern end of the fourth embayment b) Top of a fence post or wall section adjacent to the footpath above the central part of the beach (at Bennion Street)	a) FOV is along the water line and the left side of the FOV should include the back area of the embayment b) FOV is perpendicular to the beach from the elevated shoreward position that can fit both ends of the embayment in the photo

Engineered Coast

Engineered coasts are coastlines with man made structures including groynes, seawalls and breakwaters. Monitoring around coastal structures is important because they influence the immediate and adjacent beaches. The condition of the structure (appearance and structural integrity, independent of beach state) and its function (the effect of the structure on the beach i.e. is the beach eroding or accreting next to or near the structure etc.) should be monitored. Table 3 lists the key elements to be included in the FOVs for different type of coastal structures.

Table 3: Key elements to be included in the FOV

Type of structure	Key elements to be included
Groynes	Amount of sand on both sides of the groyne
Seawalls	The ends of the seawall
Breakwaters	The beach connecting to the breakwater

Table 4 below provides guidance on monitoring points and FOV for engineered coasts. When photographing engineered coasts the FOV should include the area between the dune and shoreline, as well as photos with a FOV along the structure shown in Figure 3.

Table 4: Guidance on location of monitoring points and FOV for engineered coast

Type	Beach Type	Location of Monitoring Points (MP)	FOV Guidance
3	Engineered coast - groyne/ breakwater	• Elevated MP at northern and southern boundary • MP should be 200 - 500m apart • MP at tie in of beach protection structure • MP at seaward end of structure (as far offshore as possible)	• Include area between frontal dune and water line • Northern boundary MP - view down coast • Southern boundary MP - view up coast • MP within site boundaries - view up coast and down coast • Two photos from elevated point on tie in of beach protection structure - one directly down line of structure, second to include beach and structure • Photo looking onshore towards beach protection structure from the indicative end point of its direct influence • Onshore photo requirements to be determined site by site. Apply a reversal of the "tie in" FOVs • Breakwater - FOV pulled back enough to see crest height and condition
	Engineered coast - seawall	• Elevated MP at northern and southern boundary • MP should be 200 - 500m apart • MP at each end of the structure at base and top of the structure • Depending on length of structure establish monitoring point halfway along the base and top of seawall	• Include area between seawall crest and waterline • MP along structure: FOV pulled back enough to see crest height and condition

Type 3: Engineered coast - South Beach Groynes, South Fremantle

Site	Location Monitoring Point	Field of View Description
	Rock or pole on the elevated point of the tie in of the South St groyne (provide reference point photo for exact location)	a) Line up right hand side of first FOV with the dune vegetation along the backshore b) Line up the left hand side of the second FOV with the line of the structure so that beach in its immediate lee is clear
	Pole at path entrance to beach from the mid point of the beach (see reference point photo for exact location)	a) Northwards FOV with left side looking seaward perpendicular to shore b) Southwards FOV with right side looking seaward perpendicular to shore
	Rock or pole on the elevated point of the tie in of the Island St groyne (provide reference point photo for exact location)	a) Line up right hand side of first FOV with the dune vegetation along the backshore b) Line up the left hand side of the second FOV with the line of the structure so that beach in its immediate lee is clear

Further reading

City of Geraldton and National Agricultural Catchment Council
http://www.nacc.com.au/Programs/Current-programs/Caring-for-our-Country/Coastcare/PROJECTS/NACC-Support-Projects/Geraldton-Coastal-Mon-Prog-.aspx

http://www.flickr.com/groups/gbmp/pool/map?mode=group

Gero Sunset's Photostream, Available from: *http://www.flickr.com/photos/61296717@N06/*
[Accessed on 13 February 2012].

Perth Region Natural Resource Management (NRM)
http://www.perthregionnrm.com/pr-nrm-programs/coastal/coastcare-projects-and-events/coastal-photo-monitoring-project.aspx

Southgates Photostream, Available from: *http://www.flickr.com/photos/61239956@N05/*
[Accessed on 13 February 2012].

Surf Lifesaving Australia
http://www.beachsafe.org.au/

Wilson, C, 2011, Southern Metropolitan Coastcare Program Coastal Photo Monitoring Project 2006-201, Available from: *http://www.perthregionnrm.com/pr-nrm-programs/coastal/coastcare-projects-and-events/coastal-photo-monitoring-project.aspx* [Accessed on 13 February 2012].

Acknowledgements

The Department of Transport would like to acknowledge Sam Bishopp, Ryan Carvell, Dennis Foo and Scott Ozolins for their assistance in preparing this guide. We would like to commend Riki Porteus, Ashley Robb, Chiara Denise and Mike Dufour for their ground breaking efforts in the production of the Geraldton Volunteer Beach Monitoring Program. Also thank you to Bob Gozzard from the Geological Survey of Western Australia for providing the images.

Rev 0: Author: C. DaSilva
September 2012; DoT 14842801

Cover photo: Sorrento Beach, Perth WA. (Source: GSWA, WA Coast, 2011)

Contact

Department of Transport
1 Essex St
Fremantle, WA 6160
coastalmanagement@transport.wa.gov.au
www.transport.wa.gov.au/coastalmanagement