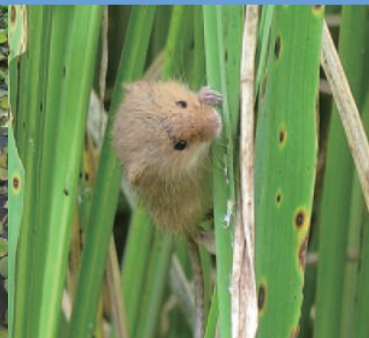
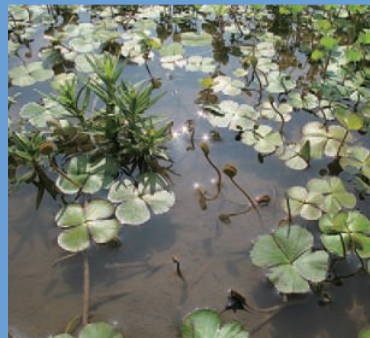
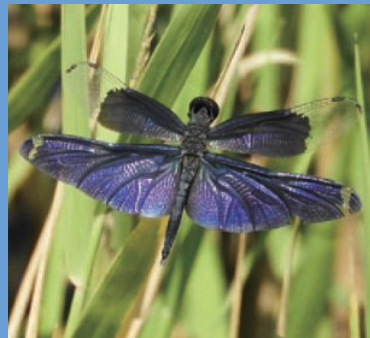




The Importance of Natural Flow of Water - Cases on various types of wetlands

Prepared for the Ramsar COP14
Compiled by Ramsar Network Japan
and Korea Wetlands NGO Network



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Contracting parties of the Ramsar Convention on Wetlands have adopted resolutions and guidelines that stress the importance of keeping natural water regime including Natural Flow of Water many times including Resolutions VIII 16, X19 and others. Likewise, International Union for the Conservation of Nature and Natural Resources, or IUCN, has also adopted resolutions and recommendations at its General Assemblies to emphasise the importance of keeping the natural flow of water from dams and hydropower plant.

However, considering globally, the implementation has not been sufficient. Global Wetlands Outlook, GWO, released in 2018 reports that the degradation and loss of wetlands still goes on, and the special edition of GWO in 2021 points out the linkage between wetland ecological character (that includes Natural Flow of Water) and implementation of strategic plan, and people's health and livelihood as well as biodiversity depend on well-managed wetland.

IUCN, at the World Conservation Congress in 2021 adopted a resolution, WCC2020.res.017: "Protection of natural flows of water for the conservation of wetlands". The resolution focuses on the conservation of biological diversity. It invites proponents of development and states in the planning of a development plan to establish and implement a nature-based plan that keeps the natural flow of water following guidelines and recommendations provided by the Ramsar Convention on Wetlands and IUCN, and in the case of existing artificial constructions, to restore the natural flow of water by reducing or removing the impact of such constructions. It covers, beyond rivers and dams, every type of flow related to wetlands as defined by the Ramsar Convention on Wetlands. Consequently, the implementation of this IUCN resolution is of importance to the Ramsar. Further, many of the contracting parties to the Ramsar Convention are members of IUCN.

This Side Event "The Natural Flow of Water - Key to Conservation and Restoration for Wetland Biodiversity" focusses on the importance of conservation and restoration of wetland biodiversity from the aspects of natural flow of water. Cases of the disturbance of natural flow of water by artificial structure or of the recovery of natural flow by removing or suppressing the impact of the structure will show how wetland biodiversity is greatly impacted. With this consideration the side event aims to consider how it will be possible to promote the idea of the IUCN Res.017, in the context of implementation of Ramsar Convention on Wetlands, for conservation and restoration of wetlands.

For the discussion we provide this booklet showing cases of positive and negative impacts on natural flow of water. We reviewed various aspects of natural flow of water (rivers, aquifer, peatland/bogs, lagoons, tidal-flats and tidal current etc.) and artificial infrastructures that disturb the natural flow (mountain tunnels, dams and weirs, drainage of peatlands/bogs, estuary barrages, tidal dikes etc.).

The Side Event consists of three parts focussing on "Natural Flow of Water."



In the first part, we introduce IUCN Resolution WCC2020-017; Protection of natural flow of water for the conservation of wetlands and explain its backgrounds and significance.

In the second part, some of the cases with both positive and negative impacts on Natural Flow of Water will be reported along with this hand out of two-page summaries of cases.

To the last, based on the case-study, we will hold a discussion session around the points; importance of implementation of Resolution of Convention of Wetland related to natural flow of water, and use of Nature-based-Solutions or ecosystem-based solutions for the implementation.

We hope this booklet will be of help in the discussion in search of the means to conserve and recover the natural flow of water.

After the side event, we will wait for reports of more cases, since we believe that this list will provide some clues for a better implementation of the IUCN WCC2020.res.017 and Resolutions of the convention.



IUCN Resolution

WCC-2020-Res-017-EN

Protection of natural flows of water for the conservation of wetlands

NOTING that the Global Wetland Outlook 2018 published by the Ramsar Convention on Wetlands states that “wetlands are declining fast, with 35% loss since 1970”, and that “quality of remaining wetlands is also suffering, due to drainage, ..., disrupted flow regimes and climate change”;

CONCERNED that a major driver of disruption and reductions to flow regimes of rivers from their headwaters to the coast, including estuaries, and from river main channels to floodplains, has been the construction of water management infrastructure, including dams, water diversion channels, coastal or estuarine barrages, double-dyke reclamations, and mega tide banks;

CONSIDERING that ground water is essential to maintain the natural flow of water because it allows rivers and lakes not to dry completely between precipitation events, hence supporting biodiversity and other ecosystem services;

NOTING that while construction of such artificial structures may provide short-term benefits to some people, they lead to deterioration of riverine, floodplain and coastal wetlands and their ecosystems through preventing the natural flow of water, and that this threatens the lives of indigenous people and local communities through impacting on traditional and sustainable use, and blocking migratory routes of fauna;

RECOGNISING that Resolution 5.089 *Dams and hydraulic infrastructure* (Jeju, 2012) and Resolution VIII.2 of the 8th Conference of Contracting Parties to the Ramsar Convention on Wetlands on *The Report of the World Commission on Dams (WCD) and its relevance to the Ramsar Convention* (COP8, Valencia, 2002) address the long-standing efforts of IUCN to overcome controversies over large dams and their impacts, including through WCD, and that the Ramsar Convention has in its resolutions and guidelines repeatedly emphasised the importance of maintaining the natural flow of water through Integrated Water Resource Management (IWRM), including Resolutions VIII.1 *Guidelines for the allocation and management of water for maintaining the ecological functions of wetlands* (COP8, Valencia, 2002) and XII.2 *The Ramsar Strategic Plan 2016–2024* (COP12, Punta del Este, 2015);

RECALLING the 3rd UN World Conference on Disaster Risk Reduction in Sendai that emphasised the role of ecosystems in disaster risk reduction (Eco-DRR); and

WELCOMING recent efforts, including the removal of the Arase and Vezins Dams in Japan and France, respectively, the proposal by the Republic of Korea for re-naturalisation of rivers, and the European Union's Water Framework Directive linking water and ecosystem services;



The IUCN World Conservation Congress 2020, at its session in Marseille, France:

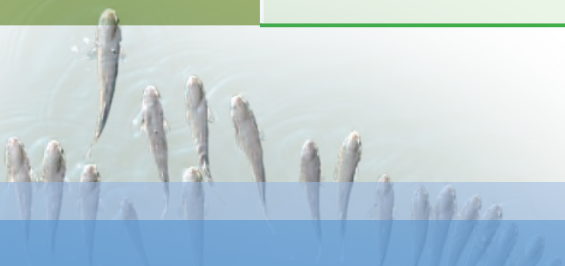
1. REQUESTS that the Director General, in collaboration with the Commission on Ecosystem Management (CEM), draws from the Global Wetlands Outlook to highlight the present situation of the loss and deterioration of wetlands in river basins and coastal regions, as well as the construction of artificial structures that prevent the natural flow of water;
2. ALSO REQUESTS the Director General, in collaboration with the Commission on Environmental, Economic and Social Policy (CEESP), to ensure that IUCN programmes protect remaining natural wetland habitats and restore functioning wetland ecosystems, promote wetland habitats as nature-based solutions to flood mitigation and carbon sequestration, and develop Communication, Education and Public Awareness (CEPA) activities on the importance of protecting and restoring the natural flow of water and its connectivity;
3. REQUESTS the IUCN World Commission on Protected Areas (WCPA), in cooperation with other stakeholders, to update the protected area management guidelines in order to guarantee effective protection of wetland habitats;
4. INVITES governments of all states, and other competent authorities, including, but not limited to, IUCN State Members, to review, reform and implement legislation based on the precautionary principle to control the construction of artificial structures that prevent the natural flow of water in rivers, on the coast, and in aquifers, to maintain wetland ecosystems and the lives and the livelihoods of people depending on them;
5. REQUESTS international and national NGO Members to propose to governments and the private sector such projects that are based on the Nature Based Principle and the idea of Ecosystem-based Disaster Risk Reduction, to maintain and improve the natural flow of water and sediments in rivers, coasts, and aquifers;
6. ENCOURAGES governments of all states, and other competent authorities, including, but not limited to, State Members to investigate removing or changing the artificial structures that have destroyed wetlands, or that have halted the natural flow of water and sediments, to restore such wetlands, where appropriate; and
7. REQUESTS governments of all states, and other competent authorities, including, but not limited to, State Members, to accept a fair third-party review, including local communities and scientists, of the necessity, validity and impacts of any project involving the building of such artificial structures.

Case Report 1


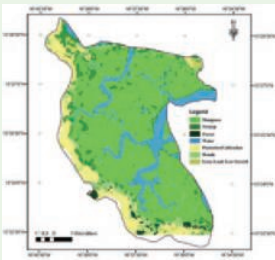

Restoration, and management of wetlands inside and outside the RAMSAR designated areas of The Gambia through Environmental awareness creation, monitoring and tree planting



Characteristic Feature	Mangrove forest, salt marshes and savanna woodland
Type of Flow	Mangrove forest, River
Place	Banjul City, Gambia (Lat. 13.4508N / Long. 16.57995W)
Artificial Structure	There are industrial warehouses and tourist fishing boats offering trips along the Oyster Creek from Denton Bridge, down south to the Daranka Bolong, and out towards the estuary and Lamin Lodge at the Daranka Channel. Pumping machine, fuel station milling factory, Hotels, Agriculture and company.
Brief explanation of the case	<p>Tanbi Wetland Complex</p> <p>Tanbi Wetland Complex, in Gambia, is located just on the southern entrance to the mouth of the River Gambia. It covers a total area of about 6,000 hectares (of which mangroves make up 4,800 hectares) and its widest expanse is located to the west and south west of Banjul. Tanbi's northern most point skirts the (Bund) Kankujeri Road of Banjul and also includes Cape Creek. It encompasses the fringes of the island of St. Mary at its Atlantic Ocean side and down south east towards Lamin and Mandinari Village. It was declared a Ramsar site (No.1657) in February, 2007.</p> <p>80 per cent of the Tanbi Wetland Complex is composed of forest wilderness is made up of several species of mangroves which includes the <i>Avicennia africana</i>, <i>Alder conocarpus</i>, <i>Laguncularia racemosa</i>, <i>Annona glabra</i> and the Rhizophora with the occasional Baobab or rhum palm standing on more solid earth. Vegetation gradually changes to bare flats, salt marsh and dry woodland or grass woodland to the west and south, with agricultural uses in the bordering zones and some anthropogenic activities which result to dye back, warehouses development factories etc. Among the animals to be found on the site are small monkeys, crocodiles, lizards as well as threatened or endangered species and migratory bird species.</p> <p>KOTU CREEK</p> <p>This area is the best-known area for bird watching. The creek can easily be reached, as it lies in the neighbourhoods of some well known hotels such as Bakotu Hotel, Bongalo Beach Hotel and Badala Park Hotel. The area comprises two different habitats. First, the rice fields which are next to the hotels. Walking around the area for just two hours will offer you the sight of up to 80 species like Spoonbill, Ibis, Painted Snipe, Herons, Terns and many other sea birds migrating from Europe. Second, there is the area next to the rice fields it is called the Nature Trail or old Cycle Track, there is also a Sewage ponds which are covered with mangrove forest, where you can watch many waders. despite the area been hot spots for bird is not legally protected.</p>
When and how long?	<p>Tanbi Wetland Complex was designated as Ramsar sites since 02/02/07.</p> <p>Since 1997 the west African bird study association was involved in different activities in Tanbi and KOTU CREEK awareness creation international water bird census, mangrove and other indigenous tree planting.</p>



	Before	After
Change of flows	Tanbi wetland and KOTU creek use to have normal flow creek water to the sea.	Due to the anthropogenic activities water flow in the creek has been affected or encounter normally water flow.
Change in ecological characteristics	Tanbi and KUTO CREEK has rich ecological characteristic of mangrove forest soli water, air and wildlife species.	Now all the ecological characteristic has been changing due to a climate and anthropogenic activities.
Pictures		

Area Map	<p>Overall map</p> 	<p>Close up map</p> <p>Tanbi map</p>  <p>Kotu creek map</p> 
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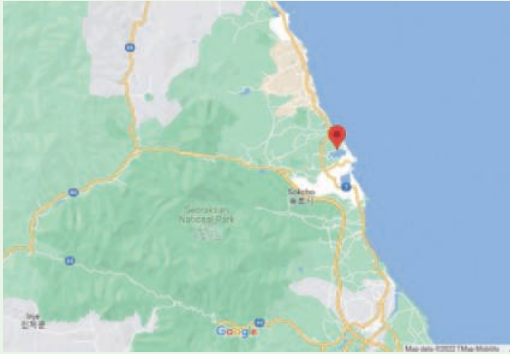
URL	www.wabsa.org	
Contact	Lamin Jobaate	e-mail : kunowabsa@yahoo.com

Case Report 2

a Floating Bridge of the Yeongnangho Lagoon




Characteristic Feature	Natural flow of water in a coastal lagoon was damaged due to a floating bridge construction
Type of Flow	a saline lagoon
Place	Sokcho City, Gangwon Province, South Korea (Lat. 38.22N / Long. 128.58E)
Artificial Structure	a floating bridge
Brief explanation of the case	The city of Sokcho installed a 400-meter-long floating bridge across the Yeongnangho lagoon to attract tourists.
When and how long?	The construction started in August 2021 and the bridge opened in November 2021.

Area Map	Overall map		Close up map	
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	Before	After
Change of flows	Free flow and exchange of freshwater and seawater	Decreased flow and exchange of freshwater and seawater
Change in ecological characteristics	Free flow of water	Decreased flow of water led to uneven icing of the lagoon. Only upper half of the lagoon was frozen in the winter.
Pictures		

URL	
Contact	+82-(0)10-9949-4191 e-mail : sm4191@hanmail.net



Additional information :

Case Report 3

Recharge dams in arid environment



Characteristic Feature	Recharge dams across all wadis of the Hajar Mountains of UAE
Type of Flow	Intermittent flows, as flashflood following occasional rainfalls
Place	United Arab Emirates (Lat. 25.38N / Long. 056.27E)
Artificial Structure	Recharge dams
Brief explanation of the case	<p>UAE stands in an arid environment, with annual rainfalls ranging from 60mm (Abu Dhabi) to 150mm (mountains areas) and have very few permanent flows of water. Strong rainfalls occur occasionally and unpredictably, creating flashfloods. These occasional flashfloods are very important for the wadi ecosystems and species adapted to these ecological conditions. The construction of dams in all wadis of the mountains has interrupted the intermittent flows of water up to the sea, disrupting species ecological cycles, and flows of sediments. Arid environments are the most productive environment for sediments, as episodic flashfloods carry tons of sediments.</p> <p>While these dams contribute to retain water used subsequently, for irrigation, they also substantially disturb the natural environment.</p>
When and how long?	The first 3 dams were built in 1982. Numbers built increased substantially in the nineties. There are now more than 114 dams over the about 3500 km ² of the Hajar Mountains of UAE (1 per 30 km ²)

Area Map	Overall map	
	Close up map	





	Before	After
Change of flows	Few wadis had permanent flow up to the sea, but most had intermittent flows, reaching the sea at the favor of rainfalls (1-3 times a year)	No more permanent flow reaching the sea Most flashflood are blocked by the dams and do not reach the sea, except a small portion of the flows generated downstream of the dams.
Change in ecological characteristics	Few permanent and mainly intermittent flows of water and sediments were reaching the sea, maintaining ecological cycles and enriching marine ecosystems.	<ul style="list-style-type: none"> -Disruption of ecological cycles of species adapted to intermittent flows -Disruption of flows of sediment from the mountains to the sea -Lack of sediments reaching the sea, impoverishes the marine productivity, ultimately affecting fisheries, and destabilizing the coastlines, that has to be consolidated by artificial structures (dykes, waterbreak...), as such exacerbating damages to coastal ecosystems -Decrease of coastal underground water level, and soil salinization
Pictures		

URL	
Contact	e-mail :

Case Report 4

Division of aquifer flow caused by tunnel of mag-lev train project



Characteristic Feature	Division of aquifer flow caused by tunnel of mag-lev train project
Type of Flow	Aquifer / Underground- water at mountain area
Place	Minami Alps tunnel, Shizuoka Prefecture, JAPAN (Lat. 35.56N / Long 138.21E)
Artificial Structure	tunnel construction
Brief explanation of the case	<p>Railway company is constructing mag-lev train line between Tokyo and Nagoya. This line plans to connect both cities (286km far) by 40 minutes.</p> <p>86% of the route is scheduled to dig tunnel, and especially this Minami Alps tunnel is planned to be 1400m deep and 25km long.</p> <p>The tunnel divides aquifer, and aquifer-water is running along the tunnel to neighbouring Prefecture.</p> <p>Ohi-River originally recharged by this aquifer will be in serious water shortage.</p> <p>Water shortage may damage the biodiversity of Minami Alps National Park above.</p> <p>Surplus soil dug from tunnel construction is planned to be dumped on precious mountain wetland.</p>
When and how long?	<p>Construction started partially in December of 2014.</p> <p>Governor of Shizuoka-pref is negotiating water issue with Railway company.</p>



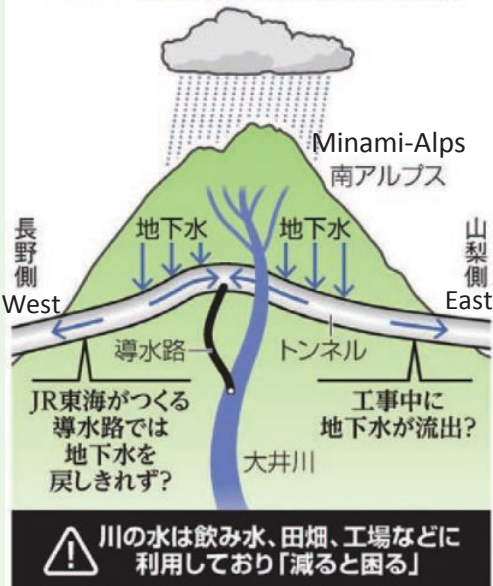
Area Map

Overall map

Close up map





	Before	After
Change of flows		Division of aquifer flow. Divert aquifer flow away along tunnel Water shortage of rivers and bogs which were originally recharged by aquifer.
Change in ecological characteristics		Water shortage at Ohi-River, and neighbouring mountain bogs. May harm biodiversity of Minami-alps national park. Surplus soil waste from tunnel construction may harm mountain wetlands and their biodiversity.
Pictures	 <p>(Source: Shizuoka-Shinbun) Ohi-river ;very low flow even now.</p>  <p>Minami-Alps National Park (Source: MoEJ)</p>	<p>Concern of Shizuoka Prefecture リニア工事をめぐる静岡県側の懸念</p>  <p>Minami-Alps 南アルプス</p> <p>長野側 ← West 山梨側 East →</p> <p>地下水 地下水</p> <p>導水路 トンネル</p> <p>JR東海がつくる導水路では地下水を戻しきれず?</p> <p>大井川</p> <p>工事中に地下水が流出?</p> <p>川の水は飲み水、田畑、工場などに利用しており「減ると困る」</p>

URL	https://scmaglev.jr-central-global.com/ (Railcompany)	
Contact	Mitsuhiro NAGAI / Ramsar Network Japan	e-mail : ny42nagai@gmail.com

Additional information :

- Minami Alps National Park
<https://www.env.go.jp/en/nature/nps/park/minamialps/index.html>

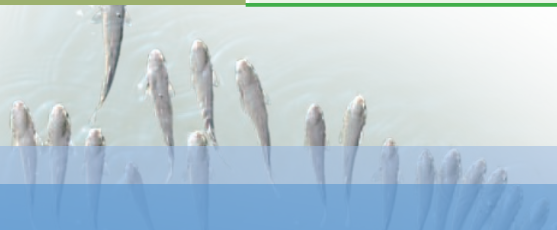
Case Report 5








Shinkansen tunnel affect in flow to Nakaikemi-shicchi (Ramsar Site No.2057)



Characteristic Feature	Impact to aquifer flow caused by Shinkansen tunnel inside Ramsar site
Type of Flow	Aquifer / Underground water at the mountain in Ramsar site
Place	Tsuruga City, Fukui Prefecture, Japan (Lat. 35.66N / Long. 136.09E)
Artificial Structure	tunnel construction inside Ramsar site
Brief explanation of the case	<p>Nakaikemi-shicchi is a Ramsar site (No.2057) which was designated in 2012. This wetland is unique because of its deep peat sediment approximately 40 meter deep at the central part. It is also considered a biodiversity hot spot with more than 2000 species of animals and plants in this area.</p> <p>However Shinkansen super express's tunnel penetrated aquifer of eastern mountain area in this Ramsar site after designation. Although the line of tunnel moved a little bit to outer area (but still inside Ramsar site) as a result of NGOs' protest, its tunnel divides aquifer and already affects the inflow of water to this site.</p> <p>Water shortage causes difficulty to maintain educational rice paddy without water pumping. Railway company has been helpful so far. But NGOs need sustainable contrivance not tentative approach.</p> <p>NGOs are now negotiating with the railway company for the restoration of swamp water and educational rice paddies.</p>
When and how long?	Tunnel construction had been approved on 2012, with a change of route on 2015, and finished construction by 2020.

Area Map	Overall map	
	Close up map	



	Before	After
Change of flows	NGO and volunteers restored and kept educational rice paddies once abandoned dependent on swamp waters from eastern mountain	Two lines of swamp water from eastern mountain had dried up.
Change in ecological characteristics	Educational rice paddies kept by NGO are popular among primary school student for its high biodiversity. The Wetland is also a major stopover for Yellow Bunting in Japan and famous for many types of dragonflies.	Plants and animals (frogs etc.) dependent on swamp water are affected. Educational rice paddies are difficult to maintain without pumping underground water.
Pictures	 <p>Red  is the valley area. (Source: NACS-J)</p>  <p>Educational rice paddies</p>  <p>Yellow Bunting</p>  <p><i>Rhyothemis fuliginosa</i></p>	 <p>— old route / — approved route (Source: NACS-J)</p>  <p>Water shortage at rice paddies</p>

URL	https://nakaikeminet.raindrop.jp/ (in JAPANESE Language)
Contact	Noriko UENOYAMA / Nakaikemi Net e-mail : nakaikeminet@gmail.com

Case Report 6

Dong-geom-do Tidal Flat Restoration



Characteristic Feature	A tidal flat restoration project that enabled seawater circulation by breaking down a seawall between islands and building a bridge.
Type of Flow	Tidal flat
Place	Dong-geom-ni, Gilsang-myeon, Ganghwa-gun, Incheon, South Korea (Lat. 37.597445N / Long. 126.514435E)
Artificial Structure	Seawall and Bridge
Brief explanation of the case	<p>After the construction of a seawall and road connecting the islands in 1985, the circulation of seawater was reduced.</p> <p>In 2018, the seawall and road was dismantled and a bridge was built to enable the circulation of seawater.</p> <p>The Ministry of Oceans and Fisheries of South Korea established a mid-term plan for the tidal flat ecosystem restoration (2019-2023) and proceeded with the tidal flat restoration project.</p>
When and how long?	<p>In 1985, an overland road in the form of a seawall connecting Ganghwa-do Island and Dong-geom-do Island was constructed. As a result, the circulation of seawater was reduced.</p> <p>In 2015, the dismantling of the seawall and construction of a new bridge for seawater circulation began.</p> <p>In 2016, monitoring of the restoration project was carried out.</p> <p>In 2018, the tidal flat restoration project around Dong-geom-do was completed.</p> <p>From 2019 to the present, follow-up monitoring of the Dong-geom-do tidal flat restoration project has been carried out.</p>





	Before	After
Change of flows	Tidal flats were deposited at an average annual rate of 1.3 to 4.4 cm. Average mud content was 97.6%	Tidal flat deposition has decreased to -1.1 to 2.0 cm per year. No significant change with average mud content of 97.7%
Change in ecological characteristics	average chlorophyll-a: 16.9 mg/m ² Large benthic organisms: 19 species average density: 471±242 ind./m ²	average chlorophyll-a: 21.8 mg/m ² (increased) Large benthic organisms: 18 species (no big change) average density: 189±198 ind./m ² (decreased). There was a tendency to increase in the second survey than in the first survey.)
Pictures	<p>Before the restoration (July 2017)</p>	<p>After the restoration (April 2021)</p>

Area Map	<p>Overall map</p> <p>Incheon, South Korea</p>	<p>Close up map</p> <p>Dong-geom-ni, Ganghwa-gun</p>
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Dong-geom-do Tidal Flat continued

URL	https://www.facebook.com/soonrae.kim.31		
Contact	+82-10-3009-5063 / Mr. KIM Soonrae	e-mail :	naga2912@hanmail.net

Additional information :

1. Maps of the restored area from the early 1980s to the present



Before the seawall and road



The seawall and road in 2014



Current view of the bridge

2. Significance of the project

Due to the decrease in seawater circulation for about 40 years, the sedimentation activity of the surrounding tidal flats had increased, making it impossible to use the livelihood facilities of fishermen such as a port. It is presumed that it may have affected the biodiversity of the tidal flat around the island.

It is meaningful in that it is a tidal flat restoration project where seawater can be circulated to maintain biodiversity and help fishermen's economic activities.

3. Result of the project

Since the tidal flat restoration, no significant changes have been observed in the tidal flat ecosystem between Ganghwa-do and Dong-geom-do until now.

However, after the natural flow of seawater, it was confirmed that the tidal flat, which were physically and ecologically divided due to the seawall and road are ① re-forming natural channels of tidewater on the tidal flat, ② such channels are gradually widening and deepening, ③ difference in sedimentary characteristics (Organic matter content, particle size, etc.) in the tidal flat are decreasing, and ④ the sedimentation rate is decreasing, showing signs of tidal flat restoration.

4. Issues and Recommendations

The project was centered on tearing down the seawall and road and constructing a bridge without scientific consideration on seawater circulation and changes in tidal flat biodiversity.

Due to the rocks constituting the seawall have not been completely removed, the seawater flow has been slower than expected, limiting the restoration of tidal flats.

The effect of tidal flat restoration is not showing properly as the project is being carried out to allow seawater flow in only some sections of the bridge.

If a similar tidal flat restoration project is carried out later, it may remain as a case in which the same mistakes are not repeated.





Case Report 7

Gongneung-cheon Estuary maintenance project



<p>Characteristic Feature</p>	<p>The estuary of the Han-gang River is a brackish water area where freshwater and seawater meet. As there is no dam, tides can flow freely. A huge wetland has been formed in the unspoiled estuary, where civilian access is strictly restricted. Numerous migratory waterbirds, including endangered and protected species, visit this wetland every year. Gongneung-cheon Stream is a tributary of the Han-gang River. The Gongneung-cheon Estuary is the closest to the brackish water area of the Han-gang River Estuary and where the aquatic ecosystem is connected.</p> <p>A sluice gate is installed at the 3km upstream of the Gongneung-cheon estuary, but the river below the sluice gate has the characteristics of tidal river. The estuary of Gongneung-cheon does not freeze well even in winter and various creatures can live there.</p> <p>The estuary of Gongneung-cheon Stream is an Ecosystem and Landscape Conservation where many protected and endangered species such as Black-faced Spoonbill, Long-eared Owl, Hen Harrier, Watercock, and Suwon treefrog live.</p> <p>So protective measures have been implemented, including a ban on fishing, a ban on motorcycles and a speed limit of 20km/h. It is also an area where the introduction of artificial facilities is restricted.</p>
<p>Type of Flow</p>	<p>Tidal flats at river estuary</p>
<p>Place</p>	<p>Area around Tanhyeon-myeon, Paju-si, Gyeonggi-do, South Korea (Lat.37° 45' 28.49"N / Long.126° 41' 22.42"E)</p>
<p>Artificial Structure</p>	<p>2 bridges, 1 drainage lock</p>
<p>Brief explanation of the case</p>	<p>Oct. 2012, The Gongneung-cheon River Management Plan Announced March 2016, Small-scale environmental impact assessment conducted Nov. 2018, River maintenance project along the Gonaneung-cheon in Paju City started March 2022, KFEM Paju, a local environmental organization announced a statement against construction April, 2022, 'Citizens' Committee to Save the Gongneung-cheon' formed</p>
<p>When and how long?</p>	<p>Gongneung-cheon and Paju area river management project. Scheduled for 2018-2023 Construction is suspended due to opposition from civic groups and residents.</p>





	Before	After
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Change of flows



Embankment road widened to 7m

Change in ecological characteristics

Results of the 2018-2020 bird survey recorded 2,530-7,059 birds (Source: Bird Census, Ministry of Environment)

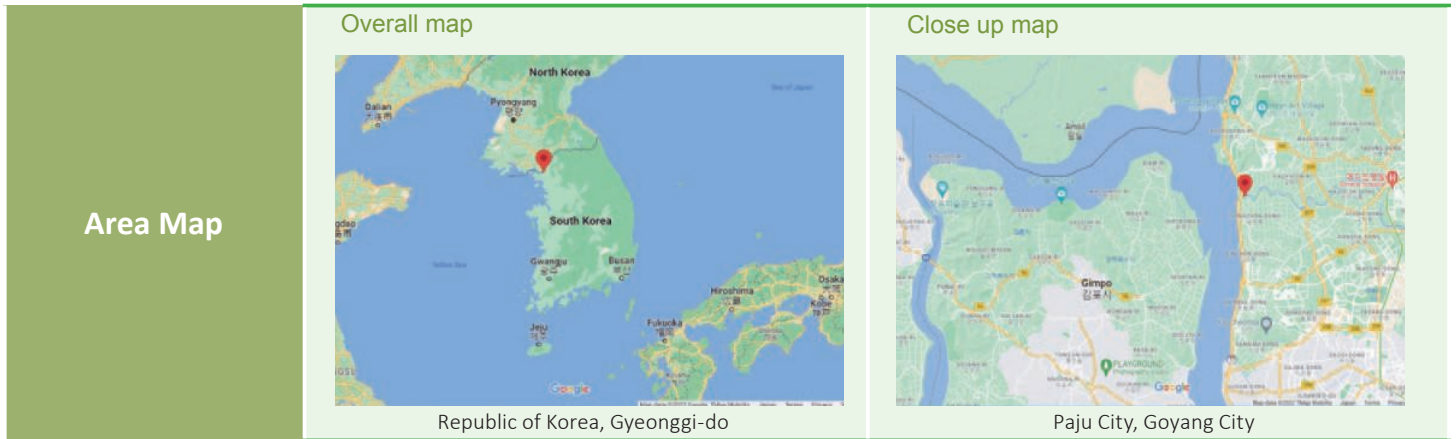
As a result of the 2021 Bird Census, it was 1,829-3,172, a decrease from previous years.

Pictures



waterway made of concrete walls

Gongneung-cheon Estuary continued



URL	
Contact	+82-10- 8812-6084 e-mail : Mr. LEE Jeongcheol, oldream29@hanmail.net

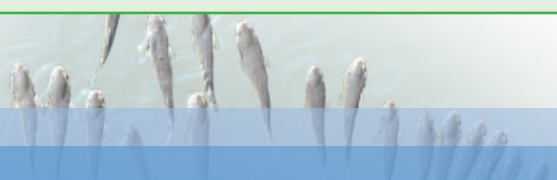
Additional information :

Gongneung-cheon and Paju District River Maintenance Project

1. Summary
 - Ordered by: Han-gang River Basin Environment Agency
 - Period: 2018-2023
 - Details: embankment extension 3.3km, bicycle path 4.2km, one bridge 238m, drainage channel
2. Current situation
 - With construction started in 2018, the construction of the bridge and the expansion of the embankment road are in the final stages.
 - Road pavement and concrete waterways are progressing considerably.
 - The construction was temporarily suspended due to the opposition of civic groups and residents claiming the poor preparation of the Small-scale Environmental Impact Assessment Report. But there is a situation in which the project is to resume construction by carrying out the capture and migration of endangered species.

Local residents' and civic groups' opinions and activities

1. The first order was placed by the Seoul Regional Land Management Agency, but the Han-gang River Basin Environment Agency succeeded the project in accordance with the policy of 'Unifying water management'. Residents and civic groups have a sense of betrayal that the Han-gang River Basin Environment Agency of the Ministry of Environment, a ministry that should give priority to the environment, 'manages construction that damages the environment'.
 - * Water management unification is a policy in which the Ministry of Environment integrates water management tasks (water quantity, water quality, disaster management, etc.) that were divided between the Ministry of Environment and the Ministry of Land, Infrastructure and Transport.
2. Damage to birds due to vehicles running on paved roads and lost forests and flora. Concerns about the destruction of the estuary ecosystem due to the obstruction of the movement of mammals and amphibians because of the artificial waterways.
3. Due to the construction, various native plant communities such as reed, *M. sacchariflorus*, and *P. latifolius*, are changed to a colony of alien species such as *A. trifida* and *S. angulatus*, which is concerned about the chain ripple effect such as the local extinction of Brown sesarmid crab.
4. Activities of the Citizens Countermeasures Committee against Gongneung-cheon Damage.





Case Report 8

Construction of Yeongju Dam in Naeseong-cheon River



Characteristic Feature	Built a large dam in the middle of the river.
Type of Flow	River
Place	Yeong-Ju City, South. Korea (Lat.36°43'20.46"N / Long. 128°39'19.06"E)
Artificial Structure	Dam
Brief explanation of the case	It was a part of the Four Major River Projects, focusing on dredging and building dams. A dam was built in the middle of the river to block the flow of water and sand.
When and how long?	December 2009, Construction started December 2016, Completion of the central dam As of 2022, the dam is not working due to defects in the dam structure.

Area Map	Overall map	
	Close up map	





	Before	After
Change of flows	The meandred flow of the river and sedimentation of sand was created naturally.	Dam construction blocks the flow of water and sand.
Change in ecological characteristics	Natural river flowing with sand (famous for its sandy course). The largest wintering site of Long-billed Plover in Korea (40-50 individuals) One or two Black Storks were wintering here every year.	Formation of a willow colony on the riverside. Long-billed Plover rapidly decreases to 10 or less and Black Stork does not arrive. The Great Cormorant, which did not exist before the construction of the dam, has become the dominant species.
Pictures	  <p>sandy course has gone.</p>  <p>내성천 강 모래 길 The Sandy Course of the Naeseong River</p>  <p>long billed plover (Source: ebird.org)</p> <p>(Source: listentothecity.org)</p>	

URL	naeseong.org
Contact	+82-10-8906-6314 / Mr. PARK June-Log e-mail : greennd@hanmail.net

Additional information :

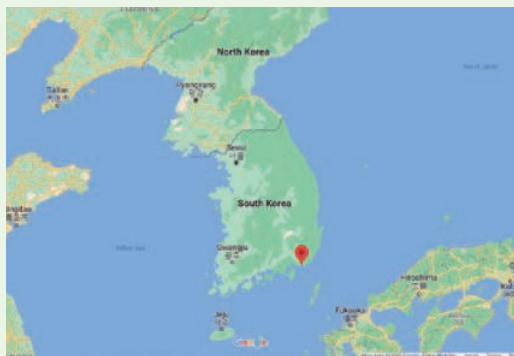

- The dam has not been filled with water since completing the construction in 2016 due to the problem of leakage because it is located on a fault zone and water quality deterioration.
- It is a major tributary supplying about 50% of sand supplied to the upper reaches of the Nakdong River
- As the dam is not holding the water, willow forest has developed in the area to be flooded by the dam, and is used as roosting site for tens of thousands of barn swallows every year. (The area was rice paddy before the dam construction.)

Case Report 9

Construction of the estuary bank of the Nakdong Estuary and a new development plan



Characteristic Feature	The part of the estuary was reclaimed and the estuary dam and large-scale bridges were built.
Type of Flow	River Estuary, Tidal flats
Place	Busan City, South Korea (Lat.35°5′N / Long.128°56′E)
Artificial Structure	Estuary Dam, Big Bridges, Reclamations etc
Brief explanation of the case	Located in the big city. After the construction of the estuary dam in 1987, the part of the estuary was reclaimed for the construction of residential and industrial complexes. Many bridges were built to connect with the city center.
When and how long?	<ul style="list-style-type: none"> - Construction of the estuary dam in 1987 - Large-scale reclamation in the 1990s - Construction of large bridges in the 2000s - Currently, 16 new bridges within the protected area and an international airport at the boundary of the protected area are under planning and construction.

Area Map	Overall map	
	Close up map	



	Before	After
Change of flows	There was a brackish water area and the natural flow of rivers and seawater.	The construction of the estuary dam eliminated the brackish water area, and the construction of a new port on the west side of the river blocked part of the seawater flow.
Change in ecological characteristics	Brackish areas existed, and there were various habitat types such as mud flats and sandy flats, branch rivers, and flood plains. It used to be one of the best habitats for migratory waterbirds in S. Korea. An average of 3,000 Whooper Swans were wintering here. Little Terns bred. 15~20 Spoon-billed Sandpipers were found every year.	The brackish water area disappeared and it was divided into seawater and freshwater areas, and most of the muddy tidal flats turned into sandy tidal flats. Whooper swans have recently declined to around 1,000, and Little Tern breeding population of more than 3,000 has all disappeared since mid-2010s. One or two Spoon-billed Sandpipers are recorded a year.
Pictures	 <p>1984년 위성사진</p>	  <p>(Source: wikimapia)</p>

URL	wbknd.or.kr	
Contact	+82-10-8906-6314 / Mr. PARK June-Log	e-mail : greennd@hanmail.net wbknd@hanmail.net

Additional information :

- Restoration of the brackish area is being attempted by opening and closing the estuary sluice gates, but the restoration attempt is only a partial one as the water flow is restricted by the size of the sluice gates.
- There is a plan to build a new international airport on the southwestern border of the protected area. The construction of the airport will result in changes in seawater flow.

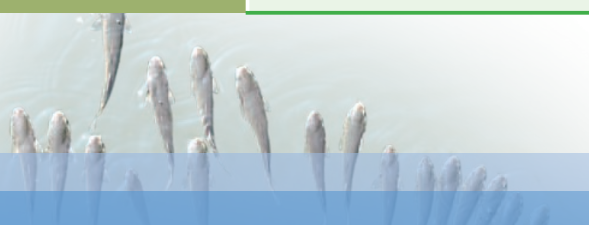
Case Report 10

Seomjin-gang River dredging work to prevent natural disasters such as flood



Characteristic Feature	Loss of river embankment and damage to waterfront facilities due to heavy rain and typhoon in 2020. Disaster Recovery Act to Prevent Damages from Natural Disasters.
Type of Flow	River (river estuaries brackish water area)
Place	Estuary of Seomjin-gang River, Hadong-gun, Gyeongsangnam-do, South Korea (Lat.35° 03' 22.94"N / Long.127° 45' 42.96"E)
Artificial Structure	Artificial embankment, River water facilities, Bridge, Railway bridge
Brief explanation of the case	<ul style="list-style-type: none"> -in 1965, construction of a dam in the upper reaches of the river (for irrigation water supply, hydroelectric power generation, and flood control) -In the 1980s, reckless sand and gravel extraction for the creation of a national industrial complex around the estuary of the river -in 1997, Seomjin-gang River Environment Administration Council established (Public-Private Council) -in 2004, the permanent ban of the river's sand and gravel extraction agreed (Sumjin-gang River Environment Administration Council) -in 2021, large-scale sand extraction in the estuary of river resumed
When and how long?	In 2021, Riverway Maintenance and Sediment Dredging Project Started (Hadong-gun) Due to opposition from civil society organizations, the further dredging plan has not been confirmed.

Area Map	Overall map	Close up map
	<p>Gyeongsangnam-do, Republic of Korea</p>	<p>Hadong-gun</p>



	Before	After
Change of flows	Heavy rain damage such as collapse of part of vicinity of the river in 2020, caused flooding of villages and farmlands.	in 2021, planning of large-scale dredging project for sediments that has been created for several years.
Change in ecological characteristics	unidentified	unidentified
Pictures	 <p>Dugok Area</p>  <p>Sinbi Area</p>	 <p>Dugok Area</p>  <p>Sinbi Area</p>
URL		
Contact	+82-10-6617-8000/Mr. BAEK Yangguk (Seomjin-gang River Basin Environment Council) e-mail : kwangyang@kfem.or.kr	

Additional information :

1. Seomjin-gang River disaster recovery project by the Hadong-gun county office

- 1-1. Background: River flood damage and sedimentary soil in the Seomjin-gang River can disrupt the flow of rivers and cause massive damage to freshwater clam fishermen.
- 1-2. Purpose: 'Reviving river functions' through dredging of Seomjingang sedimentary soil.
- 1-3. Progress
 - Initiation of detailed planning for Disaster Recovery Project, Small-scale Environmental Impact Assessment, and promotion of related tasks such as Cultural Property Index Survey service (Iksan Regional Land Management Agency).
 - The planning for the Sinbi and Dugok areas have been completed (July 2021) and dredging started.
- 1-4. Dredging area: 473,000m³ (Sinbi area), 808,750m³ (Dugok area). Total 1,281,750m³.

2. Position of the local residents

- 2-1. They claim that local fisherfolk's livelihoods have been threatened due to years of sedimentation
 - As sediment accumulates in the lower reaches of the Seomjin-gang River and trees grow, the habitat for freshwater marsh clams is reduced, and fisherfolk who make living by collecting the clams urged to remove the sediment as soon as possible.
- 2-2. Claims for damage such as flooding of houses and farmland at the river estuary during torrential rain.

3. Seomjin-gang River Basin Environment Council's position



- 3-1. Removal of sediment argued by fisherfolk collecting marsh clams
 - Opposition to the idea due to changes in the ecological character of the river and disturbance to river otters' habitat.
- 3-2. Seomjin-gang River Disaster Recovery Project
 - Large-scale damage to estuary farmers and fisherfolk caused by sand extraction in the past.
 - The cause of the flooding of the Seomjin-gang River was the unreasonable water management of the Korea Water Resources Corporation.
 - Opposition to dredging rivers in the name of flood prevention.
- 3-3. It is necessary to have further consultation on the permanent ban of the river's sand and gravel extraction.

Case Report 11

Steart Saltmarshes Restoration



Characteristic Feature	Reconnecting an estuarine floodplain
Type of Flow	Tidal saltmarsh
Place	Steart Marshes, UK (Lat. 51.198256N / Long. 3.046806W)
Artificial Structure	Seawall
Brief explanation of the case	Steart Marshes would historically have been part of a tidal estuary on the River Parrett, but has been farmed for centuries, protected by a man-made sea wall. WWT worked with the UK Environment Agency to purchase the land, reprofile the agricultural fields to mimic a functioning tidal salt marsh, and then breach the sea wall to allow a salt marsh to recreate naturally. WWT has also created a visitor centre and is managing the land, as well as monitoring it to show biodiversity, carbon sequestration and human access benefits.
When and how long?	The project started in 2009, and the sea wall was breached in 2014.

Area Map	Overall map		Close up map	
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	Before	After
Change of flows	Agricultural land disconnected from the estuary.	Tidal influx daily, salt marsh establishing and wildlife and people benefitting.
Change in ecological characteristics	Agricultural land used mainly for dairy and cattle production.	Salt marsh is being naturally created with a mosaic of habitats including ponds, reedbeds and open water. Waterbirds and other wetland species are now present in good numbers.
Pictures		

URL	https://www.wwt.org.uk/wetland-centres/steart-marshes/about/	
Contact	Mr Chris Rostron	e-mail : Chris.rostron@wwt.org.uk

Additional information :

See <https://www.wwt.org.uk/wetland-centres/steart-marshes/about/> for more

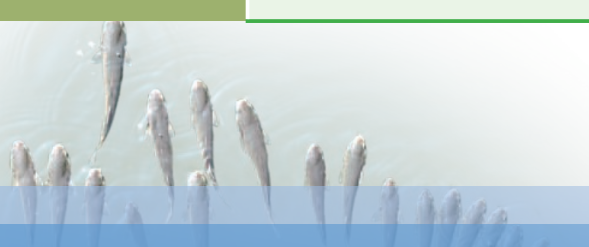
Case Report 12

Awase tidal flat reclamation



Characteristic Feature	Tidal flat
Type of Flow	Tidal current
Place	Okinawa city, Okinawa Prefecture, Japan (around Lat.26.308314N / Long127.833142E)
Artificial Structure	Sea wall (closed type)
Brief explanation of the case	Awase tidal flat lies in the eastern part of Okinawa City, the 2nd most populated municipality in the middle of the main island of Okinawa. This project originally started in early 2000s, for the needs of disposal of dredged sand. Dredging and reclamation are still going on in scope for building hotels and sport facilities. Reclamation changed the tide and the sandbar disappeared. Sea turtles and turns have lost their nesting places.
When and how long?	Landfill construction has started from 2002. The seawall construction has completed in 2009. The construction is scheduled to finish in 2031.

Area Map	Overall map	Close up map





	Before	After
<p>Change of flows</p>	<p>There was several sandbars in the reef and sea turtles and turns used there for nesting.</p>	<p>Due to the existence of the sea wall, the flow of tide changed and the sandbars disappeared. Sea turtles and turns have lost their nesting places.</p>
<p>Change in ecological characteristics</p>	<p>Seagrass bed and corals extended in large area. Many Sea fans were confirmed in sandy bottom with transparent water.</p>	<p>Loss of seagrass bed, coral communities, shell fishes. Less Sea fans confirmed. Water transparency become lower.</p>
<p>Pictures</p>	<div data-bbox="400 678 919 1025"> <p>2005</p> </div> <div data-bbox="478 1064 922 1393"> <p><i>Pseudodichotomosiphon constrictus</i> (Source:OkinawaPref.Office)</p> </div> <div data-bbox="478 1444 922 1774"> <p>Sea fan (Source:UMIERA-kan)</p> </div> <div data-bbox="135 1727 691 2103"> <p>© Tomohiko Arimitsu <i>Mictyris brevidactylus</i></p> </div>	<div data-bbox="965 678 1484 1025"> <p>2013</p> </div>

Awase tidal flat continued

URL	
Contact	Mariko ABE / Ramsar Network Japan e-mail : shark@xc4.so-net.ne.jp

Additional information :

Awase Tidal Flat is the largest tidal flat area in the prefecture, and offers a diverse environment consisting of sand, mud, coral gravel, seagrass beds, and coral reefs.

Awase tidal flat lies in the eastern part of Okinawa City, the 2nd most populated municipality in the middle of the main island of Okinawa. This project originally started in early 2000s, for the needs of disposal of dredged sand. Dredging and reclamation are still going on in scope for building hotels and sport facilities. Recently this seawall becomes obstruction of the tidal current and seawater exchange and as a result harmful algae bloom and sludge build-up over the entire tideland. This, as a result, caused a serious damage to the remaining wetlands.

Awase tidal flat and adjacent shallow environments are biodiversity-rich and local people's treasures.

This vast tidal flat is home to many migratory birds such as snipes and plovers, as well as shellfish, cockles, and other benthic organisms, making it one of the richest in Japan in terms of diversity.

After the construction has started the live coverage of sea grass and live coral coverage of outside of the seawall have significantly decreased. Thus the construction affects not only inside of the seawall but also the outside environment as well.

Also the construction deprived of habitats for many benthos.

As a result of the approach of civil societies, the business operators had to decrease the scheduled landfill area to a half of the original plan.

The mid- to long-term plan for Nakagusuku port development plan by Okinawa Prefecture states expansion of existing port for larger cruise ships. If this proceeds, the tidal flat would be damaged.



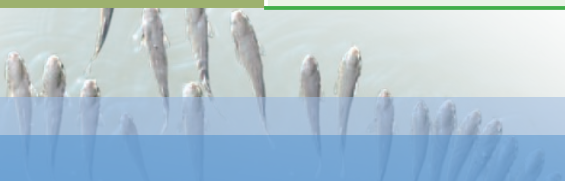


Case Report 13












Changes in Saemangeum Tidal Flat and Sura Tidal Flat in Crisis



Characteristic Feature	<p>In 1987, a seawall project to block the flow of seawater was implemented in Saemangeum tidal flat, and the wall was completed in 2010.</p> <p>Saemangeum tidal flat is located at the estuaries of the Mangyeong-gang River and the Dongjin-gang River, and is a place with high ecological, historical and cultural values.</p> <p>Sura Tidal Flat is the last unreclaimed tidal flat in the Saemangeum Project area which still plays an important ecological role.</p>
Type of Flow	<p>Estuary tidal flat</p>
Place	<p>Gunsan-si and Buan-gun, Jeollabuk-do, South Korea (Lat. 35° 53' 45.91"N / Long. 126° 36'21.93"E)</p>
Artificial Structure	<p>Seawall</p>
Brief explanation of the case	<ul style="list-style-type: none"> -in July 1987, the Saemangeum Reclamation Project was announced. -in 2000, the Saemangeum public-private joint ecological survey was carried out, but the conditions for resumption of seawall construction were prepared due to the writing of a negative report by a member of the government. -in 2001. the seawall construction resumed. -from 27 March to 31 May 2003, four religious leaders including Father Moon Kyu-hyun and Buddhist monk Sukyung took 'Three Steps and One Bow' march from the Saemangeum to Seoul. Environmental groups filed a lawsuit with the court to suspend the project. -29 January 2004, Seoul High Court decided to resume the 'Saemangeum project' -April 2006, the seawall was connected to block the flow of tidal seawater. -2012, Saemangeum Committee decided to dredge Saemangeum Lake to secure soil to reclaim internal parts of the Saemangeum. -January 2019, Saemangeum International Airport on the Sura tidal flat was planned as part of the balanced national development project on the Sura tidal flat (exempted from preliminary feasibility study) -June 2019, 100 representatives from Jeollabuk-do province, religious community and civil society urged government to open the gate of the seawall to let seawater flow into Saemangeum lake. -May 2021, an alliance was formed to stop the Saemangeum New Airport plan. -27 September 2022, 1,308 people joined to file a lawsuit to cancel the Saemangeum New Airport plan.
When and how long?	<ul style="list-style-type: none"> -Saemangeum development project: Construction of the seawall started in 1991 and is still ongoing. -Saemangeum New Airport project: 2020-2028 (planned) -Saemangeum New Airport Runway Size: 2,500x45m, 3,5km² -The Saemangeum new airport construction plan is currently under environmental impact assessment, and civil society groups are campaigning to save the Sura tidal flat. -The remaining tidal flats inside Saemangeum are still being reclaimed and dredged.





	Before	After
<p>Change of flows</p>	<p>Dec. 1992</p> 	<p>Dec. 2020</p> 
<p>Change in ecological characteristics</p>	<p>2006. Geojeon Tidal Flat in Gimje</p>  <p>2006. Mangyeong River Estuary in Gimje</p>  <p>2006. Sura Tidal Flat seen from Naecho-do island, Gunsan</p> 	<p>2013. Around Sura Tidal Flat</p>  <p>2011. Dead clams in the Saemangeum Project site</p>  <p>2011. Tidal flats around Eoun-ni, Gunsan</p>  <p>2022. Salt marshes of Sura Tidal Flat</p>  <p>2014. Sura Tidal Flat</p>  <p>2018. Sandpipers visiting the remaining Sura Tidal Flat</p> 

Before

After

Pictures



Sura Tidal Flat



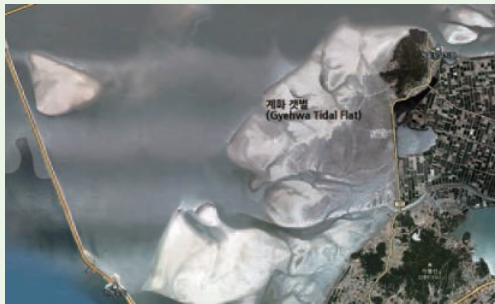
2022. Black-faced Spoonbills and salt marsh at the Sura Tidal Flat



Geojeon Tidal Flat



2022. Current state of Geojeon Tidal Flat



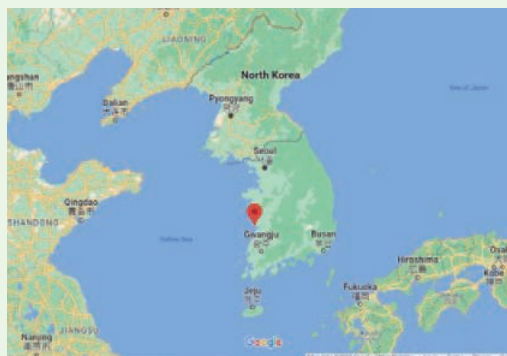
Gyehwado Tidal Flat



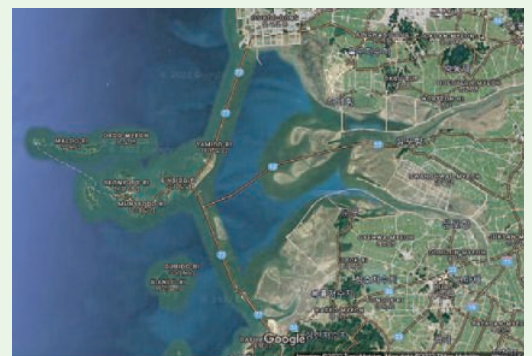
2022. Current state of Gyehwado Tidal Flat

Area Map

Overall map



Close up map



URL	https://cafe.daum.net/smglife
Contact	Mr. OH Dongpil, Co-Director of the Saemangeum Citizens Ecology Survey Team +82-10-7459-1090 e-mail : odp3004@hanmail.net

Additional information :

Saemangeum Development Project

It is a large-scale national project to build the world's longest seawall (33.9 km) and create reclaimed land (291 km²) and reclaimed lakes (118 km²) to make various economic and tourism facilities.

-Problems of the Saemangeum Development Project

The government's Saemangeum development plan is to carry out eco-friendly projects for the economy and tourism. However, it is a project that has resulted in the collapse of the local fishing industry of about 1 trillion won (about 700 million US dollars) a year, eco-tourism using tidal flats, and habitat damage for migratory waterbirds.

1. Internal dredging: The soil required for the Saemangeum reclamation is supplied through dredging within Lake Saemangeum. As a result, low-water bodies of water, an important habitat for marine life, and tidal flats, which are feeding and sheltering areas for waterbirds, are disappearing. Biodiversity in the Saemangeum is rapidly declining. Habitats for Black-faced Spoonbills and various shorebirds have been greatly reduced, and the remaining areas are in danger of disappearing. As the dredging deepens the water, the habitat of benthic organisms is being damaged, and the area where salinity stratification occurs is increasing.

2. Farmland Reclamation: The initial purpose of the Saemangeum reclamation project was to secure farmland, but 20 years later, farmland has shrunk to 30% of the total area. The agricultural land created by reclaiming the tidal flats is used to grow grass for cattle.

3. Environmental and ecological area: Although the environmental and ecological area has been determined, it does not play the role of an ecological area at all. The idea of reclaiming existing tidal flats to create ecological land is not environmentally friendly at all. Reclaiming the remaining tidal flats should be stopped and coastal wetlands should be conserved by designating them as ecological sites.

4. Insufficient seawater inflow: Since December 30, 2020, the floodgate of the seawall has been opened twice a day to receive seawater. However, with the current floodgate opening, the amount of seawater to be flowed in is not sufficient. As a result, the lower layer does not provide sufficient amount of dissolved oxygen for living things to survive. In order to solve the problem, it is necessary to increase the opening time of the floodgate.

5. Salt Stratification: According to the Saemangeum Citizens' Ecology Survey Team, long-term data shows that salinity stratification, is serious from spring to autumn every year at a depth of 3 to 4 meters. However, the Ministry of Environment still does not recognize the lack of dissolved oxygen in the bottom water. It is urgent to increase the inflow of seawater to improve water quality deterioration of the reclaimed lake.

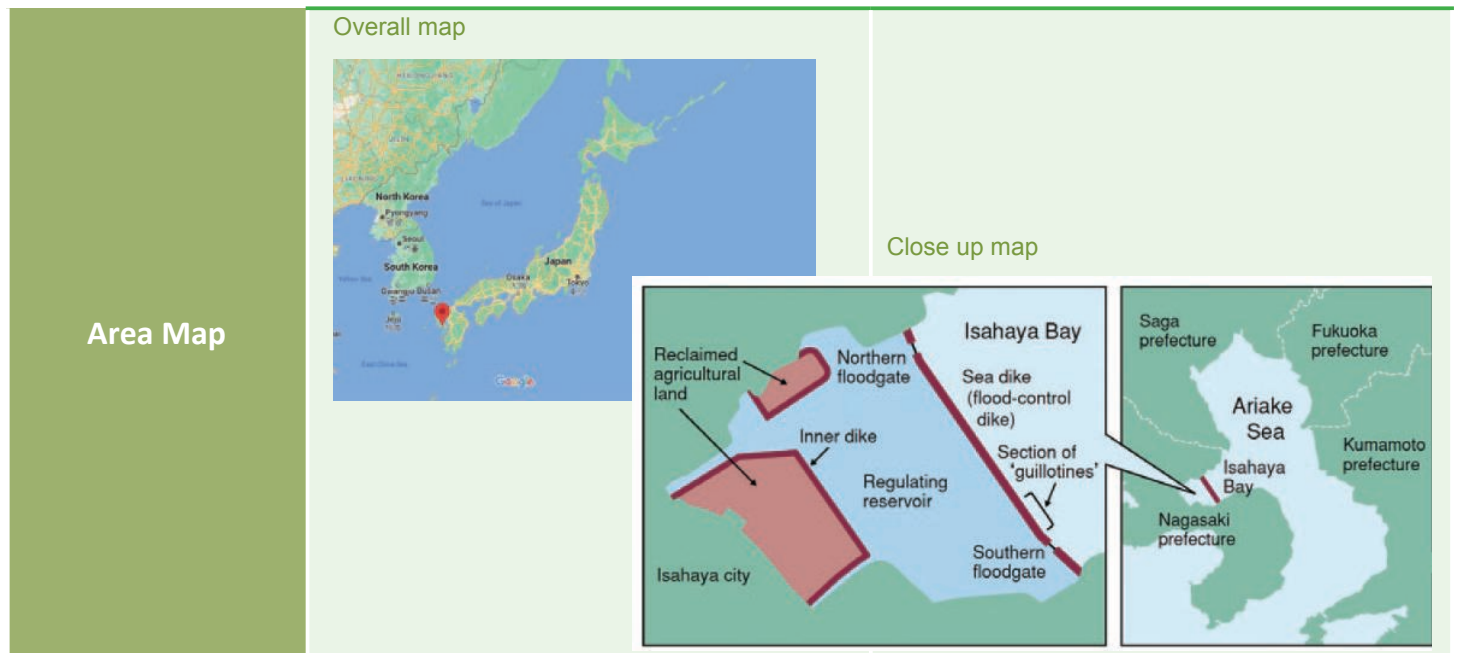
6. Sura tidal flat: It is the last unspoiled tidal flat at the estuary of the Mangyeong River in the Saemangeum area. However, despite the existing airport in Gunsan, there is a plan to build a new international airport right next to the US military base. Though the Sura Tidal Flat still has important ecological value and many important waterbirds still visit it, it is in danger of disappearing due to the construction of a new airport.


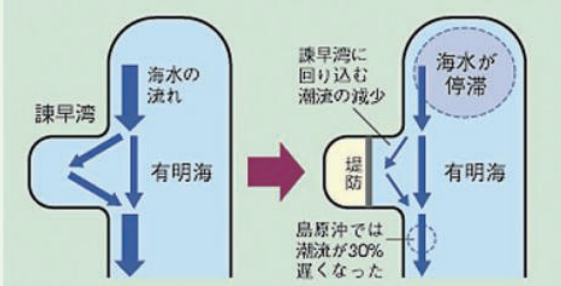



Case Report 14

The change of tidal current and damage of fishery by ISAHAYA-bay reclamation project



Characteristic Feature	Change of tidal flow affects fishery by ISAHAYA-Bay reclamation.
Type of Flow	Tidal flow
Place	Ariake-sea, Nagasaki & Saga Prefecture, Japan (Lat.32.86N / Long.130.15E)
Artificial Structure	Mega sea dike
Brief explanation of the case	Government cut off Isahaya-bay from Ariake-sea by mega sea dike for agriculture.
When and how long?	Isahaya- bay was closed off by mega dike in April 1997. The reclamation work was completed in 2008.



	Before	After
<p>Change of flows</p>	 <p>(Source: Nagasaki-Pref HP)</p>	 <p>(Source: http://www.isahaya-higata.net/)</p> <p>Mega sea dike slowed tidal current in Isahaya-bay and changed the tidal flow of Ariake-sea. Degradation of water quality in the reservoir.</p>
<p>Change in ecological characteristics</p>		<p>Tidal flat (2900ha) has gone Biodiversity dependent on tidal flat has gone. Change of tidal flow of Ariake-sea causes a big red-tide on the surface and mass poor oxygen in depth. Fishery(include seaweed and shellfish) damaged badly.</p>
<p>Pictures</p>	 <p>Isahaya Bay once teemed with flora and fauna. (Source: Community of the <i>Suaeda japonica</i> Makino)</p>	 <p>(Source: NihonKeizaiShinbun)</p>  <p>(Source: Tohoku Univ.)</p>
<p>URL</p>	<p>http://ariake-gyomin.net/ (in Japanese language)</p>	
<p>Contact</p>	<p>Minoru KASHIWAGI / Ramsar Network Japan e-mail : minoru.kash@gmail.com</p>	

Additional information :

- Environmental Justice Atlas <https://ejatlas.org/>
- Isahaya <https://ejatlas.org/conflict/isahaya-bay-nagasaki-prefecture-construction-of-the-dyke-japan>

Case Report 15

Arase dam removal



Characteristic Feature	The first case of dam removal in Japan
Type of Flow	River
Place	Yatsushiro- City, Kumamoto-Prefecture, Japan (Lat.32.42N / Long.130.64E)
Artificial Structure	Dam (removed)
Brief explanation of the case	Arase-dam was built for the purpose of hydro-electrical power in 1955. (Height 25m, Length 210m, Impound 123ha, Strage 1013700m ³) Governor had renewed water-right only 7 for years in 2003, and it expired by Mar.2010. Background of this dam removal is a civil movement against the Kawabegawa-dam project upstream of this river (This dam construction project was stopped). Removal operated only during the winter season in order to avoid fishery damage.
When and how long?	This dam removal started Sep.2012 and finished Mar.2018.

Area Map

Overall map

Close up map

(Source: Nishinihon shinbun)



Before

After

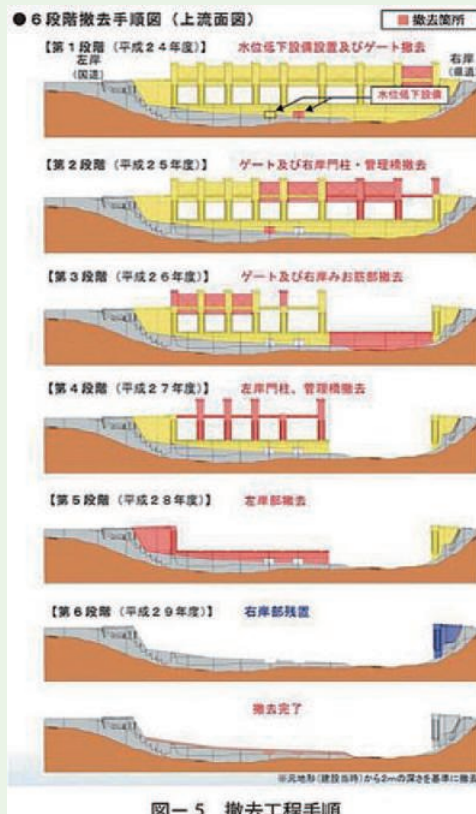


(Source: MK Products)



half removed

(Photo by Shoko TSURU)



図一 5 撤去工程手順

(Source: K yushu chihou keikaku kyokai)



fully removed

(Source: Nikkei Xtech)

Change of flows

Change in ecological characteristics

Flow and sediment was stopped by dam.

Sweet fish, typical migratory fish in Japan, was transported by truck.

Restoration of natural flow.

Rapids and pools reappeared downstream.

Revival of big eels.

Sand reaches to the tidal flat.

Revival of eelgrass at shallow sea.

Pictures



(Source: Nikkei Xtech)

Arase dam continued

URL	http://www.arasedamtekkyo.hinokuni-net.jp/ (by Kumamoto Pref. Japanese language only)
Contact	Mitsuhiro NAGAI / Ramsar Network Japan e-mail : ny42nagai@gmail.com

Additional information :

○ Arase Dam: Japan's First Dam Removal Project Underway/JFS Newsletter No.147 (November 2014)

https://www.japanfs.org/sp/en/news/archives/news_id035105.html

○ First Dam removal in Japan

By Dam Removal Europe January 12, 2018

○ 4-2. Removal of the Arase Dam:

Japan's First Attempt to Dismantle a Hydroelectric Dam and Restore the Original River Environment

<http://www.mekongwatch.org/platform/bp/english4-2.p>

Problems

The effect of Arase-dam removal is limited, because Setoishi-dam exists at upper stream of the Kumagawa river.

The new dry-dam construction project of Kawabegawa dam, once abandoned, revived due to heavy rain in July 2020.





The Importance of Natural Flow of Water - Cases on various types of wetlands

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Ramsar Network Japan

3FL., 1-12-11 Taito, Taito-ku, Tokyo 110-0016 JAPAN

<http://www.ramnet-j.org/>

e-Mail: info@ramnet-j.org

Phone&Fax: +81 3 3834 6566

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