

# PANAMA CANAL EXPANSION PROGRAM

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2010



# Expansion Program Components

## Post-Panamax Locks

Construction of new Post-Panamax locks on the Pacific and Atlantic sides. The new locks complexes will have three chambers each with water-saving basins, a lateral filling and emptying system and rolling gates.

## Pacific Access Channel

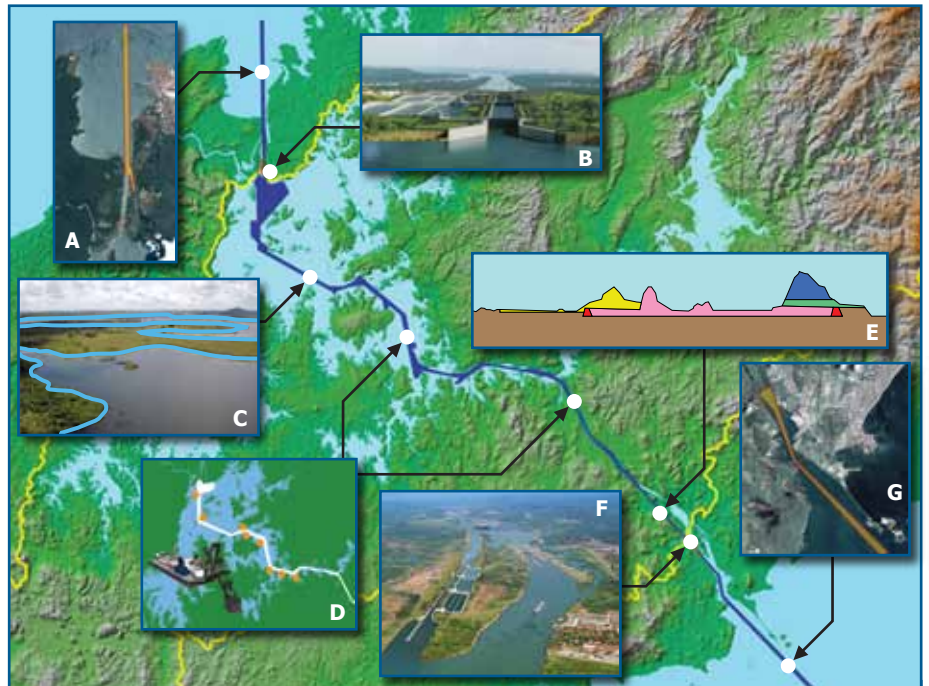
Excavation of the new Pacific Post-Panamax locks north access channel. The project requires the dry excavation of approximately 49 million cubic meters of material along 6.1 kilometers. Executed in four different phases (PACs 1 – 4).

## Improvements to Navigational Channels

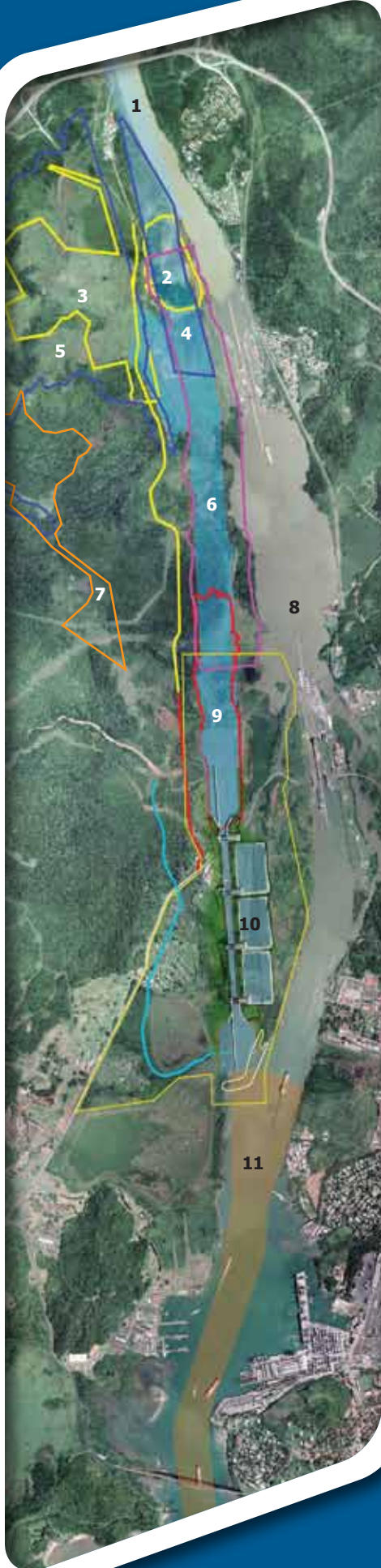
Involves dredging of the existing navigation channels to enable the safe navigation of Post-Panamax vessels through the expanded Canal.

## Improvements to Water Supply

Calls for an increase of Gatun Lake's maximum operating level by 45 centimeters to improve Canal water supply and draft dependability.



- A. Atlantic entrance deepening and widening
- B. Atlantic Post-Panamax locks
- C. Rising Gatun Lake's maximum operation level
- D. Deepening and widening of Gatun Lake and Culebra Cut navigational channels
- E. Post-Panamax locks Pacific access channel
- F. Pacific Post-Panamax locks
- G. Pacific entrance deepening and widening



- 1. Culebra Cut
- 2. PAC-1
- 3. MEC-1
- 4. PAC-3
- 5. MEC-2
- 6. PAC-4
- 7. MEC-3
- 8. Miraflores Lake
- 9. PAC-2
- 10. Pacific Post-Panamax locks
- 11. Pacific Entrance Dredging - Page 3 -
- 12. Atlantic Entrance Dredging
- 13. Atlantic Post-Panamax locks
- 14. Gatun Lake

## Excavation of the Pacific Access Channel Phase 1

This contract, which was concluded during the first quarter of 2010, was awarded to Panama-based Constructora Urbana S.A. (CUSA) on July 17, 2007, for a total of \$41.1 million.

Activities included the leveling of Paraiso Hill, from its original 136 meters to 46 meters above sea level. In achieving this, CUSA removed a total of 7.3 million cubic meters of material. The contract also included the clearing of a total 146 hectares of firing ranges, also known as MEC (munitions and explosives of concern) areas, and the relocation of 3.4 kilometers of the Borinquen Road.

COMPANY	Proposed Base Price
Constructora Urbana S.A.	\$ 41,094,000.00
Corporación MS Internacional - MECO Santa Fe	\$ 43,516,258.78
Consorcio CILSA - Minera María	\$ 44,459,871.73
International Underground Corp.	\$ 47,629,959.40
Consorcio CORESA	\$ 48,204,942.14
Consorcio EPSA Masering Murcia	\$ 55,224,233.40
Astaldi - Ghella SpA	\$ 61,930,269.41
Consorcio GRUPICA	\$ 73,132,858.57
Consorcio Condor Proimpetrol Panamá	\$ 79,960,263.11
Jay Cashman, Inc.	\$ 89,968,160.00

## Excavation of the Pacific Access Channel Phase 2

Cilsa Panama – Minera Maria was responsible for the execution of the second dry excavation contract, which was completed during the first quarter of 2010. The contract was awarded on November 27, 2007, for a total of \$25.5 million.

Activities under the contract involved the removal of 7.4 million cubic meters of material, the 3.5-kilometer diversion of the Cocoli River and the relocation of 1.5 kilometers of the Borinquen Road. Construction of this road began in May 2008.

COMPANY	Proposed Base Price
Consorcio CILSA - Minera María	\$ 25,489,200.30
Consorcio Masering Cromas	\$ 30,564,475.00
Constructora Urbana S.A.	\$ 30,913,000.00
Consorcio Conalvías Retraneq	\$ 37,492,853.18
Consorcio M&S MECO Santa Fe	\$ 40,986,400.04
Consorcio Condor Proimpetrol	\$ 42,455,577.54
Consorcio ICA Panamá - ICA CV	\$ 45,822,242.77
International Underground Corp.	\$ 61,745,339.00





The new Borinquen Road. Work under PAC-2 is seen in the background.

### Excavation of the Pacific Access Channel Phase 3

The ACP awarded this contract on December 16, 2008, to Constructora Mecco S.A., for a total of \$36.6 million.

This contract includes the excavation, removal and disposition of 8.2 million cubic meters of material, the leveling of Paraiso Hill from 46 to 27.5 meters above sea level and the clearing of 190 hectares of MEC areas.

COMPANY	Proposed Base Price
Constructora MECO S.A.	\$ 36,659,852.28
Constructora Urbana S.A.	\$ 38,200,000.00
Corporación M&S Int.	\$ 45,218,642.00
Constructora Santa Fe Ltd.	\$ 46,049,339.26
Conalvias - Retraneq	\$ 61,323,876.97
Consorcio CILSA - Minera María	\$ 74,654,321.90

### Excavation of the Pacific Access Channel Phase 4

On January 7, 2010, the ACP awarded the fourth Pacific Access Channel dry-excitation contract (PAC-4) to consortium ICA-FCC-MECO, for a total of \$267,798,795.99.

PAC-4 includes the excavation of nearly 26 million cubic meters of unclassified material; the construction of the Borinquen dam, which will separate the waters of Miraflores Lake from the new channel; and clearing of 80 hectares of MEC-contaminated areas.

After the issuance of the order to proceed, the consortium will have 1,288 calendar days to complete the work.

COMPANY	Proposed Base Price
FCC-ICA-MECO	\$ 267,798,795.99
ISC Panamá	\$ 294,913,000.00
Jan De Nul - CHEC	\$ 359,102,231.18
Odebrecht	\$ 379,803,132.13

### Dredging of the Pacific Entrance Navigational Channel

This project consists of the widening of the Panama Canal Pacific entrance navigational channel to a minimum 225 meters and deepening to 15.5 meters below mean low water level, as well as partial construction of the Pacific Post-Panamax locks south access.

A total of 9.1 million cubic meters of material will be removed under this project awarded on April 2, 2008 to Belgian company Dredging International Panama for a total of \$177.5 million.

COMPANY	Proposed Base Price
Dredging International	\$ 177,500,676.78
Boskalis International BV	\$ 258,851,577.20
Jan De Nul N.V/Van Oord Dredging and Marine Contractors BV	\$ 485,453,336.00

PAC-3 work area with Centennial Bridge in the background.



## Dredging for the Deepening and Widening of Gatun Lake and Deepening of Culebra Cut

ACP personnel is responsible for all dredging work to be conducted for the deepening and widening of Gatun Lake, as well as the deepening of Culebra Cut, from which 27 million cubic meters of material will be removed.

To complete this project, the ACP is using the drill boats Thor and Baru and dredges Mindi and Rialto M. Christensen, aside from the dredge Il Principe leased to Jan de Nul n.v.

Dredging work began on October 6, 2008 with dredge Il Principe after several months' preparation work with ACP's drill boat Thor.



April 2009



March 2010

Removal of the De Lesseps island.

## Dredging of the Canal Atlantic Entrance

On September 28, 2009, the ACP awarded the contract for the dredging of the Atlantic entrance to the Canal to Belgian company Jan de Nul n.v.



Land-based dredging (Atlantic side).

At a total \$89.6 million, the contract was awarded under a lowest-price negotiated bidding process.

Following are the companies or consortia and their corresponding price proposals as submitted on September 9, 2009:

COMPANY	Proposed Base Price
Joint Venture Boskalis - Dredging International	\$ 177,611,840.00
Van Oord Dredging	\$ 162,182,828.00
China Harbour Engineering Co. Pilotec, S.A.	\$ 116,732,224.00
Great Lakes Dredging and Dock Co.	\$ 195,943,129.00
Jan de Nul N.V.	\$ 89,617,317.00

The work includes the deepening of the approach channel to 15.5 meters below mean low water level, which will require dredging of some 14.8 million cubic meters of material, and the excavation of an additional 800 thousand cubic meters of material.

An area of approximately 13.8 kilometers will be dredged to widen the Atlantic access channel from its 198 meters to a minimum 225 meters, and the north access channel to the new locks on the Atlantic side to a minimum 218 meters.

This contract includes an option for additional deepening work up to 16.1 meters from a volume of 2.3 million cubic meters of material at a cost of \$16,408,600. Both volumes include the 60-centimeter dredging tolerance.

# Third Set of Locks



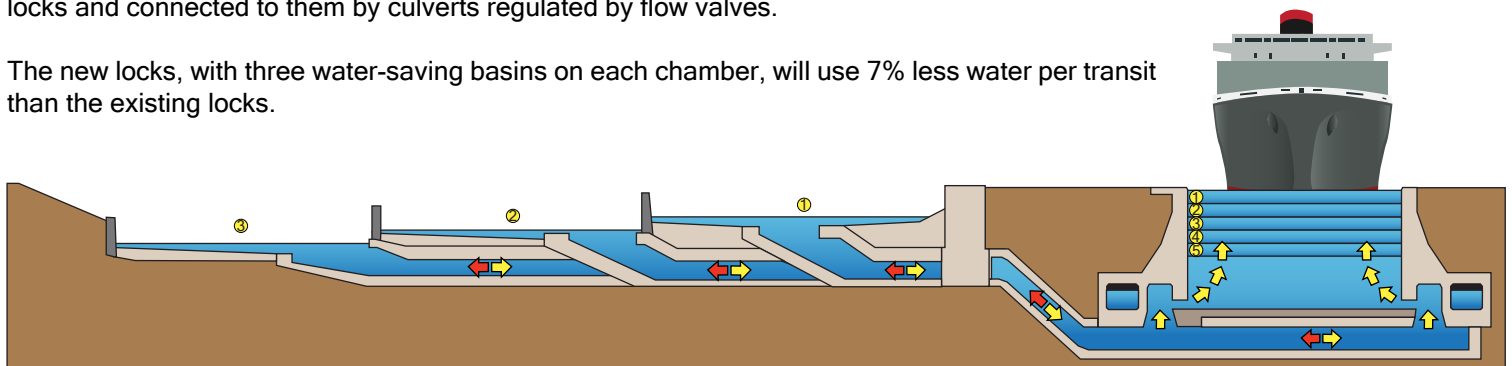
## POST-PANAMAX LOCKS

The new locks complexes will have three chambers each, water-saving basins on each level, a lateral filling and emptying system and rolling gates.

## WATER-SAVING SYSTEM

Water-saving basin (WSB) technology is the most efficient system to reduce the volume of water to be used by the new locks. The WSBs work as water-damming structures located adjacent to the locks and connected to them by culverts regulated by flow valves.

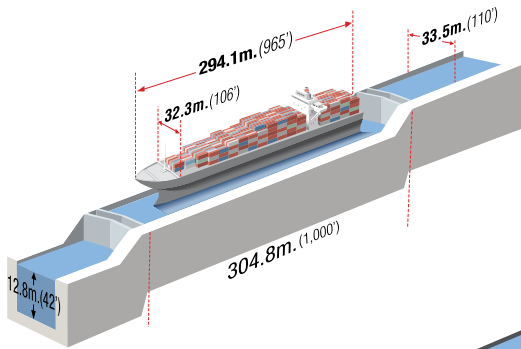
The new locks, with three water-saving basins on each chamber, will use 7% less water per transit than the existing locks.



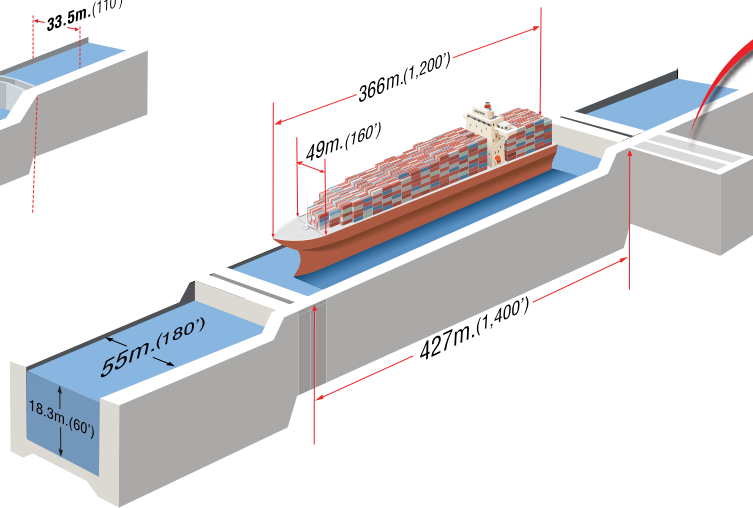
①, ② and ③: Water is transferred by gravity to WSBs for the following lockage.  
④ and ⑤: Once equalized, it moves to the next level and eventually to sea.

# General Information on the New Locks

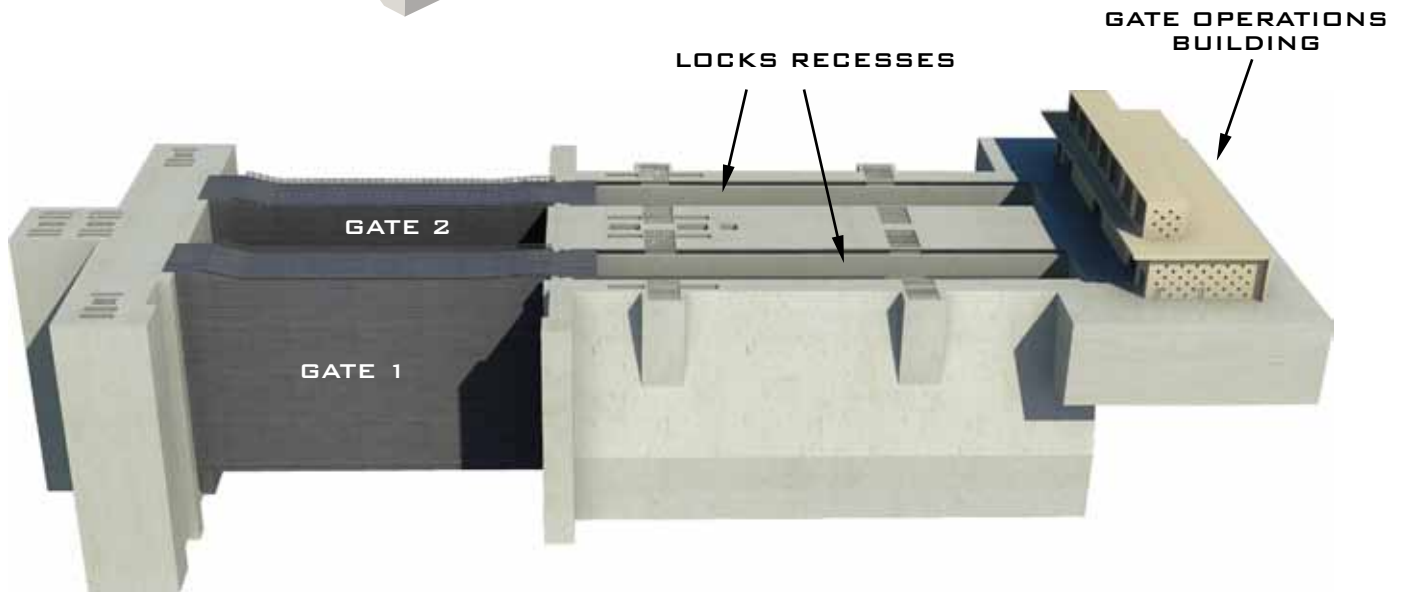
## EXISTING LOCKS



## NEW LOCKS



The use of rolling gates eases their maintenance.



## GATES AND RECESSES

The new locks will require 16 rolling gates that will operate from adjacent recesses located perpendicular to the lock chambers. Such gate configuration allows each recess to perform as a dry dock, which in turn enables servicing the gates on site without the need to remove them and therefore interrupt lock operations.

Miter gates, as the ones currently in operation, do not have a recess, which makes it necessary to remove and transport them to a dry dock for overhaul. This process requires the interruption of lock operations.

## Design and Construction of the Third Set of Locks

After seven months of intensive administrative and field work, efforts for the design and construction of the Third Set of Locks by consortium Grupo Unidos por el Canal (GUPC) progress under strict management by the team responsible for the administration of the Third Set of Locks project.

As wildlife rescue and relocation activities are completed in the areas located within the project footprint on the Atlantic and the Pacific, consortium contractors begin clearing and grubbing tasks and topographic surveys. All this occurs under close supervision by ACP Environmental Management and Surveillance experts, who guarantee that all activities comply with the Environmental Management Plan.

As soon as the areas are cleared, activities such as the assembly of the large equipment that will excavate the nearly 37.7 million cubic meters of material from the Atlantic and Pacific sites to enable the construction of the locks are initiated.

A myriad of other activities is being conducted simultaneously including the construction, remodeling and refurbishing of contractor and subcontractor office buildings, storage areas, laboratories and shops; the design and acquisition of the main plant to produce concrete and crush the rock, along with all utility installations and others required for the operation of these large industrial parks. The demolition of existing buildings within the Atlantic locks construction perimeter is almost completed as well.

The locks contract represents approximately 60 percent of the overall budget for the Expansion Program, which purports that the details of its administration are as comprehensive as the contract itself.

The diversity of tasks handled every day by the team administering the locks project includes overseeing equipment mobilization activities, location of the plant, ground movement and the implementation and installation of security measures and devices, aside from guaranteeing the availability of access roads both for project equipment and personnel and for the residents of adjacent communities.



Third Set of Locks activities on the Pacific side began on August 25, 2009, as well as on the Atlantic side.



Large heavy equipment is used to conduct excavation work on the Atlantic side.

PARTICIPATING CONSORTIA PROPOSALS AND SCORES								
Consortium	55%	40%		5%		Total Price Proposal	45%	100%
	Technical Score (Maximum 5,500)	Price Proposal	Price Score (Maximum 4,000)	Provisional Sum Price Proposal	Provisional Sum Score (Maximum 500)		Price Proposal Total Score (Maximum 4,500)	Total Score (Maximum 10,000)
Bechtel, Taisei, Mitsubishi Corporation	3,789.5	\$ 4,185,983,000.00	2,980.3	\$ 93,836,670.00	-	\$ 4,279,819,670.00	2,980.3	6,769.8
C.A.N.A.L.	3,973.5	\$ 5,981,020,333.00	2,085.9	-	500	\$ 5,981,020,333.00	2,585.9	6,559.4
Grupo Unidos por el Canal	4,088.5	\$ 3,118,880,001.00	4,000.0	\$ 102,751,383.00	-	\$ 3,221,631,384.00	4,000.0	8,088.5
Amount of Allotted Funds - ACP \$ 3,481,000,000.00								

### Environment

In compliance with its commitment to protect and preserve the environment, the ACP along with the contractors for each component of the program and in coordination with Panama’s National Environmental Authority (ANAM), conducts wildlife rescue and relocation operations as it progresses in the various projects being executed under the Expansion Program.

These activities are developed from the early stages of work planning following a Rescue and Relocation Plan for each specific area before conducting any clearing or grubbing activities. To date, animals including mammals, amphibians and reptiles, among them crocodiles, turtles and sloths, have been rescued and relocated as part of this effort.

As part of the ecological compensation for the first three dry-excavation contracts and Gatun Lake dredging, the ACP, jointly with ANAM, has reforested 415 hectares nationwide. For 2010, the ACP has an additional 150 hectares scheduled for reforestation in different areas of the country.

By the first quarter of 2010, the ACP had also already paid ANAM \$2,415,254 as ecological compensation for the execution of the Expansion Program. Consortium Grupo Unidos por el Canal, which is responsible for the design and construction of the Third Set of Locks, has paid Panama's Aquatic Resources Authority (ARAP) the amount of \$499,000 for the reforestation of mangrove areas.

### Accountability

Fulfilling its responsibility to provide information about the Expansion Program, and in compliance with Law 28 of July 17, 2006, the ACP submits quarterly reports on the progress achieved to the Executive Branch, the National Assembly, the Republic's Controller General, the Ad-hoc Committee (formed by members of civil society) and the multilateral financing agencies.

The contents of these reports can be accessed on the ACP Internet page [www.pancanal.com](http://www.pancanal.com) for public consultation. Fourteen reports have been published as of the first quarter of 2010.

The ACP also often receives visits by government officials and other organizations seeking to learn first-hand about program progress. Expansion work has also caught the interest of different sectors of the civil society, including university students, professionals, foreign visitors, workers, businessmen and diplomats.



A resident of the Piedras Gordas community in the Division General Omar Torrijos National Park, participates in the reforestation project.

The Expansion Program has also established a hotline (800-0714) and e-mail address (ampliacion@pancanal.com) to provide general information on the program.

Regarding the environment, the ACP has established strict environmental surveillance and monitoring based on a five-level structure to guarantee compliance with program environmental commitments.

This structure is formed by contractor environmental personnel, ACP environmental surveillance personnel, the independent consultant responsible for compliance evaluations and reports, and the international multilateral financing agencies, for which reports on local and international environmental requirement compliance shall be issued. ANAM is Panama government's monitoring agency.

The environmental surveillance and monitoring is conducted in coordination with ANAM, which receives biannual reports on the environmental development of the program and conducts joint inspections. To date, two main environmental compliance reports have been submitted to ANAM on the overall Expansion Program and more than 12 joint inspections have been conducted.

## Paleontological and Archaeological Studies

In January 2009, the ACP renewed its contract with the Smithsonian Tropical Research Institute (STRI) to locate and analyze paleontological findings on the sites of the Third Set of Locks project.

As a result of this agreement, a paleontological potential map for the Panama Canal Area was developed. Based on this map, a series of paleontological rescue activities have been conducted on the site of the future Gatun Locks on the Atlantic side and in the area of Cartagena Hill on the Pacific side.



Paleontological survey in Gatun.

The ACP has continued conducting the technical evaluation of archaeological findings in the expansion areas. To date, the inventory of findings includes arrows dating from the pre-Columbian era and bottles from the beginning of the 20th century, which are being used to document the pre-Columbian and historical reality on this side of the country.

Archaeological findings are assessed and registered after they are categorized through bibliographic searches, photographed and analyzed according to their importance and historical relevance.

All the information is gathered in a results analysis report that is submitted as official correspondence to Panama's National Cultural Institute (INAC) Historical Patrimony Bureau for registration and archive and for use as reference material.

Residents from the community of Lomas de El Montuoso participate in the reforestation project.





The Atlantic dredging team and contractor personnel check project drawings on the field.

## Labor Aspects

When Panamanians cast their vote on October 22, 2006 to support the ACP's plan to develop the colossal Canal Expansion Program, a commitment to training was immediately endorsed.

The government took advantage of this opportunity to launch a program through which the National Institute for Professional Education and Human Resources Development (INADEH, its acronym in Spanish) would train the workforce that would be required for the program. This training has contributed to meeting the Expansion Program's labor demand, which for the locks project alone will require nearly 7,500 skilled workers.

Up to February 2010, the Expansion Program had already generated some 3,282 employments among the contracts already completed and those currently under execution.

The Canal organization, in cooperation with INADEH, has now launched the training of the work force it will require within the next few years, especially on skilled positions such as explosives experts and heavy equipment operators.



Gathering readings from a measuring device at the site of the 1939 excavation in Gatun.



Wildlife rescue activities.

## Financing

On October 14, 2008, then Panama President Martin Torrijos Espino announced the Cabinet Council's authorization for the Panama Canal Authority (ACP) to negotiate the required \$2,300 million financial support for the expansion of the waterway with a group of multilateral and bilateral credit organizations.

From the beginning of 2007 through December 2009, the ACP administration conducted negotiations for the financing of the Expansion Program, always keeping the ACP Board of Directors informed and maintaining close coordination with a liaison group designated by the Executive Branch.

After being authorized by the Cabinet Council, the ACP Board of Directors proceeded to approve the signing of financial support contracts with the following institutions:

FINANCING INSTITUTIONS	
European Investment Bank (EIB)	\$ 500 million
Japan Bank for International Cooperation (JBIC)	\$ 800 million
Inter-American Development Bank (IDB)	\$ 400 million
International Financial Corporation (IFC)	\$ 300 million
Andean Development Corporation (CAF)	\$ 300 million
<b>Total</b>	<b>\$ 2,300 million</b>



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