California Water and Infrastructure Report

For December 3, 2020

by Patrick Ruckert

Published weekly since July, 2014

An archive of all these weekly reports can be found at both links below:

http://www.californiadroughtupdate.org

https://www.facebook.com/CaliforniaDroughtUpdate

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"NAWAPA could supply an additional 135 billion gallons of fresh water to the United States, Canada, and Mexico, plus power, and vast new areas of cultivation. It would involve thousands of skilled jobs to construct and operate."

From our Feature this week: The North American Water and Power Alliance Project

A Note To Readers

Drought has increased in intensity over the past weeks throughout the Southwest region of the nation, especially in California. We begin with several reports, demonstrating an increased serious concern by water mangers.

And here we are in December and Red Alerts of fire danger are occurring daily, and we even have a

major fire exploding in Southern California, and accompanying that are electricity shut-offs and alerts throughout the state, especially as high wind events in both northern and southern California are occurring.

Because of the ongoing drought, California's water managers on Tuesday preliminarily allocated just 10% of requested water supplies to agencies that together serve more than 27 million Californians and 750,000 acres of farmland.

Concluding our reporting of current developments this week you may enjoy the report on China's Chang'e 5 spacecraft landing on the Moon, which includes an amazing video. This mission will be the first in over 40 years that will dig up soil and rockets from the Moon's surface and return the sample to the Earth.

Our **Feature** this week focuses on the long ago proposed North American Water and Power Project that was a highlight of the building of water infrastructure during the President John Kennedy administration.

North America with a proposed high-speed rail system and the continental water management project, NAWAPA. Map: Benjamin Deniston

This project was a continental water management system that brought about five percent of the waters of the Alaska and Yukon rivers to the entire west and midwest parts of the U.S. and to Mexico. It was endorsed by the Prime Minister of Canada and was active legislation in the U.S. Congress. As the insane financialization of the economy and the rise of environmentalism in the early years of the 1970s put a stop to actual real economy projects and investments, NAWAPA, too, faded from the agenda of the nation. During recent decades the LaRouche political organization has revived interest in the project and promoted it with studies, videos and articles.

Before we begin, first this:

Three weeks after the presidential election there still is no officially accepted President-elect. President Trump is contesting the reported vote in half-a-dozen contested states. While the media and the Democratic Party claim that Biden does deserve that title, there are at least 75 million Americans who know he would be an illegitimate president no matter how the fight turns out.

Biden's "transition team" is a recycled Obama administration and full of the worst of the "regime change" war mongers, proponents of the insane "New Green Deal" and beholden to the Wall Street parasites who provided more than $100 million dollars to his campaign. Such an administration has already said they will virtually shut down the revived manned-space program, by putting off the scheduled Moon mission (Artemis) from its now scheduled landing of the first woman and the next man on the Moon in 2024. Delaying that mission to 2028 will mean killing it.

Antonio Guterres, the Secretary General of the United Nations, speaking Tuesday at the 2021 Global Humanitarian Overview at the UN, said: "This year, 2020, has been a year like no other. Conflict, climate change, and COVID-19 have created the greatest humanitarian challenge since the Second

World War. The number of people at risk of starvation has doubled. Hundreds of millions of children are out of school. Levels of extreme poverty have risen for the first time in 22 years."

There are few people who are not now aware, and frightened, that the world is in a state of disintegration—economically, socially, strategically and politically. The exception is China, and to a lesser extent the rest of East Asia.

That is the world we are faced with today.

I have presented in these reports many times what must be done. To summarize, the leaders of the U.S., Russia and China must meet and come to an agreement for joint action to address this crisis of civilization. The content must begin with the Four Laws presented by Lyndon LaRouche, applied internationally.

Those four laws are:

(1) The immediate re-enactment of the Glass-Steagall law instituted by U.S. President Franklin D. Roosevelt, without modification, as to principle of action.

(2) Return to a system of top-down, and thoroughly defined, National Banking.

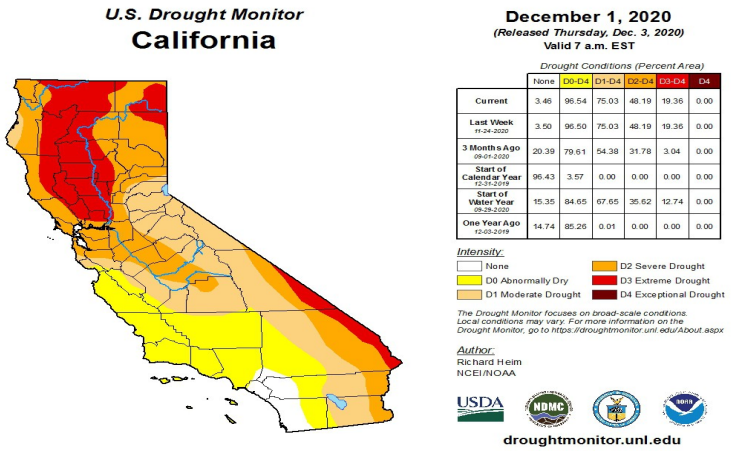
(3) The purpose of the use of a Federal Credit-system, is to generate high-productivity trends in improvements of employment, with the accompanying intention, to increase the physical-economic productivity and the standard of living of the persons and households of the United States.

(4) A Crash Program for Fusion and an expanded manned-space program.

Drought and Fires

U.S. Drought Monitor for California-- December 1, 2020

While there is no change in the extent or the intensity of drought in Calfornia this past week, in the first article below the U.S. Drought Monitor, two maps of the state compare this month in 2019 to the present year. It is a striking difference.



The West

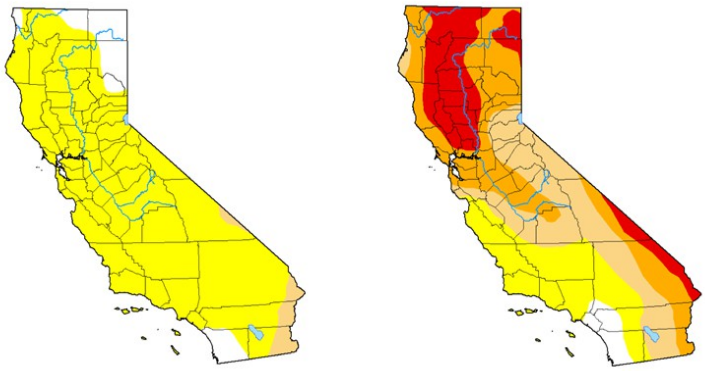
Even though over 2 inches of precipitation fell locally in the coastal Pacific Northwest, it was still below normal. Only small parts of Montana, Arizona, and New Mexico were wetter than normal this week. The rest of the West had little to no precipitation, or what precipitation that fell was below normal. Abnormal dryness contracted in parts of Washington and northern Idaho where the indicators

reflected improving conditions in recent weeks, and drought improved in a few parts of Oregon and worsened in other parts. Severe to exceptional drought expanded in Utah, with exceptional drought expanding in parts of Nevada, Arizona, and Colorado. Extreme and exceptional drought expanded in parts of New Mexico. Parts of northeast Nevada received precipitation this USDM week, but it was still below normal. The failure of the summer monsoon resulted in record dryness to the Southwest states, and record heat over warm season increased evapotranspiration, resulting in record SPEI values over the last 3 to 6 to 9 months. The SPEI values were not only record, they exceeded previous records by huge margins. The expansion of exceptional drought reflected this prolonged dryness. According to USDA reports, topsoil moisture was short to very short across 82% of New Mexico, 81% of Utah, 75% of California, 54% of Montana, 47% of Idaho, 42% of Oregon, and 35% of Nevada. In Oregon, 20% of the winter wheat crop is in poor to very poor condition. Jiggs Reservoir, in northeast Nevada, is nearly dry.

Is California Heading For A Multi-Year Drought? The Odds Aren't In Our Favor, Experts Say.

- Ezra David Romero

Monday, November 30, 2020 | Sacramento, CA
https://www.capradio.org/articles/2020/11/30/is-california-heading-for-a-multi-year-drought-the-odds-arent-in-our-favor-experts-say/



Drought maps of November 26, 2019 versus November 25, 2020. The National Drought Mitigation Center

With no rain in the forecast for the rest of 2020 — thanks to a La Niña weather pattern pushing storms north of the state — the probability of California entering a multi-year drought is increasing.

"We did fortunately get some rain in November," said Michelle Mead, a warning coordination meteorologist with the National Weather Service in Sacramento. "However, since that time, it has been drying, and we even had some wind events. So we're very quickly back into fire season."

An autumn with little rain and a forecast for a dry December is reminding weather and climate experts of the patterns that took place before last year's mild winter. That season, much of the state only got about half of what's normal, bringing a majority of Northern California into what could be two years of

below average precipitation.

With more than two-thirds of the state experiencing some sort of drought and water supplies just below average, another dry year wouldn't break the bank. But it could point to a trend — mulit-year droughts — not too far back in California's memory.

But what happens with La Niña heavily determines what the water year will look like, said Stanford climate scientist Noah Diffenbaugh.

La Niña historically has meant drier, colder winters in California. The weather pattern occurs in the Pacific Ocean where strong winds blow warm water at the surface of the ocean from South America to Indonesia. As the water moves west, cold water moves to the surface near the coast of South America. This results in storms mostly landing in the Pacific Northwest versus California.

We are forecasting above normal high temps and dry conditions for the first week of December as the storm track is expected to shift well to our north. #CAwx

Are We Headed Into A Multi-Year Drought?

Climate scientists and meteorologists are mulling this question because it's common for California to go from drought years to wet years. But the past few years have all been very warm, which increases drought severity, says Dan McEvoy, a climatology research professor with the Desert Research Institute in Reno.

"There's not a single storm expected in the next week and if you look out to about two weeks, it's staying quite dry with very, very minimal precipitation," he said. "We're starting to kind of get into overlapping dry seasons, where we had last year ended up being really dry and we're falling into drought this year again."

But when should Californians start to worry about another multi-year drought? California leaders begin to worry once there are two years of drought conditions, because the system is designed to weather three years of drought.

"For the reservoirs, they can sustain California water supply for up to three years without any degradation," said Mead with NWS. "But after three years, if we don't have a good winter, then of course we look to the state to figure out water restrictions and things of that nature."

It might be December but fire concerns haven't subsided. Here's why

David Benda Damon Arthur
Redding Record Searchlight
November 30, 2020
https://www.redding.com/story/weather/2020/11/30/might-almost-december-but-fire-concerns-shasta-county-havent-subsided/6466921002/

A dry start to the North State's rainy season is raising fire concerns.

After no rain in October, Redding received just 1.5 inches of precipitation in November and hasn't received any measurable rainfall since May.

That has fire officials warning residents that it's still fire season. Moreover, the National Interagency Fire Center shows a significant potential for wildfire in the North State and portions of Southern California.

Evacuations Ordered For Fast-Growing California Wildfire; Power Outages Top 130,000

By Ron Brackett

December 3, 2020

https://weather.com/news/news/2020-12-03-southern-california-wildfire-orange-county-bond-fire-evacuations

Driven by fierce Santa Ana winds, a house fire in California's Orange County spread to nearby brush and has exploded to more than 11.25 square miles.

The Orange County Fire Authority tweeted that it had received reports that multiple structures may have been damaged from the fire. "We are in the process of verifying the number involved and the extent of damage," the tweet read.

Officials ordered mandatory evacuations for residents of Modjeska, Silverado and Williams canyons and for Foothill Ranch and parts of Portola Hills. Voluntary evacuation warnings were issued for part of the Lake Forest community and for Borrego Canyon, Baker Ranch, Live Oak Canyon, Trabuco Canyon, Rose Canyon and Valley Vista Way and Meadow Ridge Drive.

More than 500 firefighters were battling the fast-moving blaze known as the Bond Fire, the Orange County Fire Authority tweeted.

“We were expecting gusts of up to 70 miles per hour in this area,” Capt. Thanh Nguyen told KCBS. “We’ve seen the wind change also drastically, so that’s what we’re telling all our personnel to be aware of that constantly changing wind."

Gusts over 75 mph were recorded in several locations Wednesday night, the National Weather Service reported.

In anticipation of the fire danger, Southern California Edison cut power to about 47,000 homes and businesses. The utility was considering de-energizing lines serving 248, 000 customers in eight counties throughout the windy period, which could last into Saturday.

San Diego Gas & Electric, which said one of its weather stations recorded a wind gust of 94 mph, has cut power to more than 73,000 customers.

More than 130,000 customers were without electricity as of 8:30 a.m. Thursday, according to poweroutage.us.

California winds bring fire threat, possible power outages

Christopher Weber, Associated Press

Updated 11:26 pm CST, Wednesday, December 2, 2020

https://www.thetelegraph.com/news/article/California-utilities-may-cut-power-as-fire-danger-15769224.php

LOS ANGELES (AP) — Californians hoping December would finally usher in wetter weather after a disastrous fire season were instead bracing Wednesday for another round of dry winds that raised the threat of wildfire danger and widespread power shutoffs.

Utilities in the southern part of the state warned they may cut electricity to more than 350,000 customers as a precaution during the windy period expected to last into the weekend.

Southern California Edison had cut off power to about 15,000 customers by Wednesday night and warned that it was considering interrupting power to well over a quarter of a million customers in seven counties.

That would be about 5% of the utility's 5 million customers and would affect the counties of Kern, Los Angeles, Orange, Riverside, San Bernardino, Tulare and Ventura.

In this Oct. 27, 2020 file photo, residents watch as the Blue Ridge Fire burns above blacked-out homes in Chino Hills, Calif. Southern California utilities say they may cut power to more than 300,000. (Photo: Jae C. Hong, AP)

San Diego Gas & Electric had cut the electricity to about 10,600 customers by Wednesday night and warned that some 84,500 others could see power shutoffs lasting for days. They could affect some inland and coastal communities and "fire- and wind-prone backcountry communities" in an area at high risk of fires, the utility said on its website.

"We recognize losing power is disruptive, and we sincerely thank our customers for their patience and understanding," the utility said.

The National Weather Service issued red-flag warnings of extreme fire danger through Saturday, especially for mountains and canyons, because of dry, gusty Santa Ana winds, low humidity and parched vegetation.

"Overnight and in the early morning hours the winds are really going to get going," said meteorologist Adam Roser with the weather service in San Diego. Gusts could top 75 mph (121 kph) in some areas and widespread winds nearing 50 mph (80 kph) are possible across the region, he said.

Southern California's Santa Ana winds blow from the interior toward the coast and often bring powerful gusts, especially below mountain passes and canyons. Though most prevalent in October and November, the winds are not uncommon in early December, Roser said.

Northern California, which has seen more precipitation this fall but not much recently, was expecting dry, windy weather starting this weekend.

California already has experienced its worst-ever year for wildfires. They have scorched more than 6,500 square miles (16,835 square kilometers), a total larger than the combined area of Connecticut and Rhode Island. At least 31 people have been killed and 10,500 homes and other structures damaged or destroyed.

The latest fire threat comes as much of California plunges deeper into drought. Virtually all of Northern California is in severe or extreme drought while nearly all of Southern California is abnormally dry or worse.

"Critical fire weather conditions" possible this weekend in Bay Area

Amid no rain, the National Weather Service warns of offshore winds Sunday that bring new fire risk

https://www.mercurynews.com/2020/12/02/critical-fire-weather-conditions-possible-this-weekend-in-bay-area/

More will be known in the next few days, he said. But the dangerous conditions have already arrived in Southern California.

There, the National Weather Service issued a red flag warning from Wednesday night through Saturday from Santa Barbara to San Diego, with low humidity and gusty winds increasing the chances of fires like the Thomas Fire, which started two years ago on Dec. 4 in similarly dry conditions and destroyed more than 1,000 homes in Ventura and Santa Barbara counties. Southern California Edison warned Wednesday it was considering power shutoffs for up to 270,000 customers, mostly in Riverside, San Bernardino, Ventura and Los Angeles counties.

The lack of rain so far this season has been highly unusual.

Two weeks ago, on Nov. 17, Northern California received a decent storm, which delivered 2 to 3 inches in the mountains from Mount Tamalpais in Marin County through the Santa Cruz Mountains to Big Sur, dramatically curbing fire risk. It also brought 2 to 3 feet of snow in the Sierra. Many ski resorts have reopened in the Lake Tahoe area, albeit with help from machine-made snow and limits from state COVID regulations that require skiers to make reservations to keep crowd sizes down.

But that storm system didn't bring much rain to Bay Area cities, the East Bay Hills or the Diablo Range. On Wednesday, San Francisco was at only 11% of normal rainfall for this date, and San Jose and Oakland were at 5%.

Worse, no chance of a good rain appears in the forecast for the Bay Area over the next 10 days "It's very significant that we're seeing the potential for red flag fire conditions in Northern California this late in the season," said Daniel Swain, a climate scientist at UCLA. "It's unusual but not unheard of in Southern California. But up in the Bay Area, and moister parts of Northern California, it's pretty extraordinary."

The reason for the dry weather? Persistent ridges of high pressure air along the West Coast have been blocking incoming storms off the Pacific, including several larger atmospheric river events, and pushing them north into British Columbia and Southern Alaska, Swain said.

Winter's dry start prompts low California water allocation

December 2, 2020

https://apnews.com/article/climate-california-03632c2e43639c99c365047eb89dc21d

SACRAMENTO, Calif. (AP) — California's water managers on Tuesday preliminarily allocated just 10% of requested water supplies to agencies that together serve more than 27 million Californians and 750,000 acres of farmland.

The state Department of Water Resources cited the dry start to the winter rainy season in California's Mediterranean climate, along with low reservoir levels remaining from last year's relatively dry winter. Winter snow typically supplies about 30% of the state's water as it melts.

Last year's initial allocation also was 10% and climbed only to 20% when the final allocation was made in May. Most areas that depend on the state-supplied water also have other sources including groundwater, streams and their own reservoirs.

The department's eight precipitation measuring stations scattered across Northern California collected a record-low 0% of average rainfall in October and 53% in November.

Meanwhile, the state's major reservoirs are lower than they were at this time a year ago.

Lake Shasta, the federal Central Valley Project's largest reservoir, is at 75% of its historical average, down from 119% a year ago. Lake Oroville, the State Water Project's largest reservoir, is at 61% compared to 90% last year.

"While we still have several months ahead of us, dry conditions persist," department Director Karla Nemeth said in a statement urging the state's nearly 40 million residents to conserve water. "As communities throughout California prepare to support their environment and economies through times of extended dry periods, state agencies plan together to support those communities."

The initial allocation uses conservative assumptions and is updated monthly as conditions change based on snowfall and water runoff. The department will conduct this winter's first snow survey south of Lake Tahoe on Dec. 30.

Chang'e-5 Has a Busy 24 Hours on the Moon

Dec. 2 (EIRNS)—The Chinese Chang'e-5 orbiter took color photographs of the lander as it was descending from orbit toward the surface of the Moon, late last night, Dec. 1. The photos were released in real time. The lander subsequently took a color panorama of the area near the landing site. Photos of the landing site show a flat surface, with no large boulders, and few small rocks, perfect for Chang'e-5's rock and soil collection mission.

The lander also completed the drilling for the underground soil samples, and packaged them for transport. It started on the scooping of surface soil samples.

In response to *Beijing Youth Daily*, who mentioned that Roscosmos and the European Space Agency had conveyed congratulations for the success so far of the mission, Foreign Ministry spokeswoman Hua Chunying expressed China's gratitude to the international community for its support, and "This marks a historic step for China's exploration of outer space, and also a historic step for international cooperation on the peaceful use of outer space."

Watch China's Chang'e 5 spacecraft land on the moon in this amazing video

By Andrew Jones a day ago

You can see it collect moon samples, too!

https://www.space.com/china-chang-e-5-moon-landing-lunar-sample-video

A spectacular video from China's Chang'e 5 lander spacecraft revealsits successful touchdown on the moon as it softly set down to collect the first lunar samples in 44 years.

The 49-second, sped-up video was captured by a camera underneath the Chang'e 5 lander as it passed over the vast Oceanus Procellarum ("Ocean of Storms") while aiming for a safe landing site on Tuesday (Dec. 1). The black-and-white footage shows peaks on the horizon before the spacecraft moves into a vertical position to begin its powered descent onto the surface. Another video, released by China's CCTV news network, shows Chang'e 5's sample-collection arm drilling into the lunar surface as it collected samples. (We combined them into one in the video above.)

In the descent video, craters of all sizes appear and disappear as the lander slows its fall. With all of this taking place around 236,000 miles (380,000 kilometers) away and signals taking two seconds to travel from the Earth and back, the process needed to be automated.

Chang'e 5 used a gamma ray altimeter to gauge the distance to the surface and optical and laser systems to detect potential hazards. The lander appears to hover as it selects its landing site and makes it final descent.
The spacecraft launched on Nov. 23 and finally touched down safely Tuesday at 10:11 a.m. EST (1511GMT, 11:11 p.m. Beijing Time) near Mons Rümker, a volcanic peak. However the landing is only one part of a very challenging mission which aims to deliver the first fresh lunar samples to Earth since the 1970s.

The spacecraft began collecting samples within a couple of hours of landing, both scooping from the surface and drilling into the lunar regolith to obtain scientifically precious material.

An ascent vehicle will launch the valuable cargo back into lunar orbit on Thursday in preparation to dock with the waiting Chang'e 5 orbiter. The orbiter will then carry the samples back towards Earth, releasing a reentry capsule that will enter the atmosphere and land around Dec.16.

If all goes well scientists will have the first new lunar samples in decades which potentially could be billions of years younger than those collected previously by Apollo and Soviet Luna missions.

The samples could help scientists understand why this area of the moon may have been geologically active long after volcanism in most other parts of the moon had ended.

Feature: The North American Water and Power Alliance Project

During the 1960s, the building of water and other infrastructure was, along with the Apollo Project to put a man on the Moon, the driver of real economic development and a dramatic increased in the living standards and the well-being of the entire U.S. population.

Two short videos present overviews of the project. Those are followed by a longer video of the half-a-dozen water projects initiated or dedicated by President John Kennedy-- projects that give one today a sense of the environment of ***building*** that characterized the real economy of the early 1960s.

The introduction to a major article on the project from Executive Intelligence Review is presented, and I urge those who wish to get the full, in-depth picture of the project to go to the link of the article.

The map below of the 1960s **"North American Water and Power Alliance"** (NAWAPA) shows the continental scale of the needed water supply improvements in North America, and also makes the point on how behind, and backward, the economies of the United States, Canada, and Mexico have

needlessly become under 30 years of anti-development "free market" policies. For three decades, while the amount of money poured into mergers, speculation, and the "markets" rose, investment in infrastructure, industry, and agriculture slowed down to nothing.

"Soft infrastructure" has likewise been shorted, and ratios are dropping of per-household numbers of hospital beds, diagnostic equipment, etc.

The NAWAPA Project shown here, was drawn up by the Pasadena, Calif.-based firm of Ralph M. Parsons Co., and favorably reviewed by Congress in the 1960s for completion by the 1990s, but it was never begun. The idea is to divert southward some 5-15% of the MacKenzie River (northern Canada), and other Alaska and Yukon runoff now going towards the Arctic, channelling it through the 500-mile Rocky Mountain trench, then along various routes, eventually reaching even Mexico. The broken lines show new, navigable canals.

The principle--on a grander scale--is the same as that of the Tennessee Valley Authority of the 1930s, and the 1950s St. Lawrence Seaway, both shown on the map. NAWAPA could supply an additional 135 billion gallons of fresh water to the United States, Canada, and Mexico, plus power, and vast new areas of cultivation. It would involve thousands of skilled jobs to construct and operate.

When you visualize overlays on this NAWAPA map, of expanded rail links, magnetically levitated routes, upgraded levees, and new power, water, and mass transit for cities, plus refurbished farm regions, you begin to see the vast overdue projects and potential at home in North America.

Videos on NAWAPA and the JFK water projects:

NAWAPA Part One

https://www.youtube.com/watch?v=_MibzpJ54do&fbclid=IwAR2SMKLXSH9Hyb-KeoHgl5i8c2wI0o41B7VgJGPSSuY11ZwwIUm82cM_tY8

NAWAPA Part Two

https://www.youtube.com/watch?v=D0dsc-341O8

The Parsons Corporation produced this video in 1964. The North American Water and Power Alliance is an idea whose time has come.

JFK Speeches Toward a Nation Wide TVA

https://www.youtube.com/watch?v=TP8xpevlLNE

December 6, 2012 - LaRouchePAC -

To better understand the significance of NAWAPA, LaRouchePAC presents to you the memory of JFK, by means of six speeches on the subject of national resources. In this period of national amnesia, remember our last expression of national pride, John F. Kennedy; remember through these films a legacy which is your own, even if you are unaware of that fact.

Article:

Nuclear NAWAPA XXI, Desalination, and the New Economy

This article appears in the September 27, 2013 issue of ***Executive Intelligence Review.***

by Michael Kirsch

https://larouchepub.com/eiw/public/2013/eirv40n38-20130927/04-19_4038.pdf

This is the third in our series of articles from the 21st Century Science & Technology Special Report, "Nuclear NAWAPA XXI: Gateway to the Fusion Economy" (http://21stcenturysciencetech.com/Nuclear_NAWAPA.html).

An economy is an integrated process, whose character is to constantly evolve as such. Today, that evolution must be spearheaded by a 21st-Century North American Water and Power Alliance (NAWAPA XXI), driven by fission, with a fusion economy on the horizon.

The completed NAWAPA XXI will be more than delivery corridors of freshwater: It will be the bounding infrastructure network of a more advanced economy and society, and a scientific resource management of a new kind. With the widespread application of fission for electricity, heat, and desalination, combined with a system of continental water resource management, the several crises in water, food, energy, transportation, jobs, etc., all merely symptoms of the failure to implement these measures decades ago, will be solved.

For this, a complete dedication of human and productive resources currently existing in the United States, Canada, and Mexico, will be required. Their economies will be put into high gear, requiring assistance from China, South Korea, and Japan for the mass-production of the latest nuclear power plants and machine tools. A rapid training program to produce the necessary skilled labor will be initiated. These include workers in the construction crafts, machine-tool operators, engineers, and scientists of all kinds.

Even before construction of a full NAWAPA XXI system begins, coastal desalination, desalination of irrigation wastewater, groundwater, and Southwest river water, through the mass production of fission reactors, will raise the level of productivity of our lands and cities and halt the collapse. Food production will be maintained, coastal cities will be sustained, and large areas of agricultural land will

increase yields in the short term, supporting the growth process.

Drawing upon the built-up skilled labor and industrial capacity associated with this process, construction on the core trunk line of NAWAPA XXI will begin. The higher quality of concentration, skill, and foresight of engineers and the labor force will shorten the timetable. Scientists will have been using these new nuclear plants as locations for research and application of the most advanced technologies available, including those associated with fusion, plasma processing, and power. Commercialized fourth-generation nuclear reactors and nuplexes will be introduced into the early phases of NAWAPA XXI construction and planning.

New mining technologies will be developed, and new types of minerals will be processed and available to industry. Cutting-edge technologies will be applied throughout the machine-tool sector and the manufacturing and transportation processes. New careers in sciences of all kinds will be needed for exploring, designing, constructing, manufacturing, and managing of an integrated water and power system, and establishing infrastructure and cities at higher levels of technology than ever before.

In short, an economy unrecognizable from today's vantage point will emerge, making possible the most productive relationship between mankind and the biosphere yet achieved.

This process of development is described in what follows, beginning with the wide application of Kennedy-era nuclear desalination plans.

Phase 1:
NAWAPA XXI Treaty and Application of Nuclear Desalination

The Model for Nuclear Desalination