## Water DA

### 1NC: Drought DA

#### A water crisis is coming and will cause instability and conflict – nuclear energy solves.

White 9 Garry (Commodities Editor ) “Can nuclear solve the global water crisis?” The Telegraph December 20th 2009 <http://www.telegraph.co.uk/finance/newsbysector/energy/6851983/Can-nuclear-solve-the-global-water-crisis.html> JW

As the global population expands, demand for water for agriculture and personal use will increase dramatically, but there could be a solution that will produce clean drinking water and help reduce carbon emissions as well. That process is nuclear desalination. Many areas of the world are suffering from a water crisis – and it's not just arid, developing countries that are suffering. The Western US is particularly vulnerable and its water crisis is getting more severe by the day. Las Vegas could be one of the first US cities to be hit by a serious water shortage, some are even questioning whether it can survive at all. The city gets 90pc of its water from Lake Mead, the body of water created by the Hoover Dam. The water in Lake Mead, and the Colorado River which feeds it, has been falling for some time. It is slowly running dry due to overuse. The Scripps Institution of Oceanography believes there is a 50pc chance that the lake will be completely dry by 2021 if climate change continues as expected and future water usage is not curtailed. Water is so important that, as a population grows and demand increases, there is a strong chance of conflict in the future. According to the World Water Council, 260 river basins are shared by two or more countries. "In the absence of strong institutions and agreements, changes within a basin can lead to transboundary tensions," the Council said. "When major projects proceed without regional collaboration, they can become a point of conflicts, heightening regional instability." The World Water Council cites the Parana La Plata in South America, the Aral Sea, the Jordan and the Danube as examples. It's not just tensions between countries that are a potential problem. Civil unrest caused by scarcity has already started. In India on December 3, one man was killed and dozens injured during a protest over water rationing in Mumbai following the country's poor Monsoon. The prospect of further water riots is very real. However, nuclear energy could help provide the solution for this thorny issue. Oil-rich Middle Eastern nations are rushing to build new nuclear plants. Anwar Gargash, a foreign affairs minister in the United Arab Emirates (UAE), said last month that nuclear power was "best able" to meet future power demand in his country. Demand for electricity is expected to double by 2020. This followed comments from Saudi Arabia, which said it planned to generate up to a quarter of its electricity from nuclear power within the next 15 years. Everyone thinks the trend for oil-rich nations to move towards nuclear power generation is about limiting domestic consumption so they can boost oil exports. However, that's just part of the story. Saudi Arabia, for example, has very little water – and global warming is likely to make this situation much worse. This is a major problem because Saudi Arabia is about to see its population explode. The overwhelming majority of the Saudi people are young. Almost 40pc of its population is under the age of 14, with just 2.5pc being in the over 65 bracket. This means its population is growing at about 2pc per year – and as the young start to have families of their own, the rate of population growth will increase. In fact, many of the nations that are predicted to have the strongest growth in population over the next years are the areas where the water crisis is most acute. For example, the UAE has the largest growth rate of any nation in the world – at 3.69pc, according to data compiled by the US government. Nuclear reactors can be used to generate electricity – but they can also be used to desalinate water. Nuclear desalination is not a new idea – it's a proven technology, thanks to Kazakhstan. A single nuclear reactor at Aktau on the shore of the Caspian Sea successfully produced up to 135 megawatts of electricity and 80,000 cubic metres of potable water a day between 1972 and 1999, when it was closed at the end of the reactor's life. Water has also been desalinated using nuclear reactors in India and Japan. The problem with desalination is that it is very energy intensive. Most desalination today uses fossil fuels, contributing to carbon emissions. However, because nuclear power generation does not emit carbon, it is a clean and efficient way of producing the most important commodity around. For countries experiencing rapid population growth, it could be a lifesaver.

#### Causes nuclear conflict.

Zahoor 11 Musharaf (researcher at Department of Nuclear Politics, National Defence University, Islamabad ) “Water crisis can trigger nuclear war in South Asia” Writer-South Asia June 4th 2011 http://writerasia.blogspot.com/2011/06/water-crisis-can-trigger-nuclear-war-in.html JW

Islamabad, 4 June: Water is an ambient source, which unlike human beings does not respect boundaries. Water has been a permanent source of conflict between the tribes since biblical times and now between the states. The conflicts are much more likely among those states, which are mainly dependent on shared water sources, reports Musharaf Zahoor in KMS. The likelihood of turning these conflicts into wars is increased when these countries or states are mainly arid or receive low precipitations. In this situation, the upper riparian states (situated on upper parts of a river basin) often try to maximize water utility by neglecting the needs of the lower riparian states (situated on low lying areas of a river basin). However, international law on distribution of trans-boundary river water and mutually agreed treaties by the states have helped to some extent in overcoming these conflicts. In the recent times, the climate change has also affected the water availability. The absence of water management and conservation mechanisms in some regions particularly in the third world countries have exacerbated the water crisis. These states have become prone to wars in future. South Asia is among one of those regions where water needs are growing disproportionately to its availability. The high increase in population besides large-scale cultivation has turned South Asia into a water scarce region. The two nuclear neighbors Pakistan and India share the waters of Indus Basin. All the major rivers stem from the Himalyan region and pass through Kashmir down to the planes of Punjab and Sindh empty into Arabic ocean. It is pertinent that the strategic importance of Kashmir, a source of all major rivers, for Pakistan and symbolic importance of Kashmir for India are maximum list positions. Both the countries have fought two major wars in 1948, 1965 and a limited war in Kargil specifically on the Kashmir dispute. Among other issues, the newly born states fell into water sharing dispute right after their partition. Initially under an agreed formula, Pakistan paid for the river waters to India, which is an upper riparian state. After a decade long negotiations, both the states signed Indus Water Treaty in 1960. Under the treaty, India was given an exclusive right of three eastern rivers Sutlej, Bias and Ravi while Pakistan was given the right of three Western Rivers, Indus, Chenab and Jhelum. The tributaries of these rivers are also considered their part under the treaty. It was assumed that the treaty had permanently resolved the water issue, which proved a nightmare in the latter course. India by exploiting the provisions of IWT started wanton construction of dams on Pakistani rivers thus scaling down the water availability to Pakistan (a lower riparian state). The treaty only allows run of the river hydropower projects and does not permit to construct such water reservoirs on Pakistani rivers, which may affect the water flow to the low lying areas. According to the statistics of Hydel power Development Corporation of Indian Occupied Kashmir, India has a plan to construct 310 small, medium and large dams in the territory. India has already started work on 62 dams in the first phase. The cumulative dead and live storage of these dams will be so great that India can easily manipulate the water of Pakistani rivers. India has set up a department called the Chenab Valley Power Projects to construct power plants on the Chenab River in occupied Kashmir. India is also constructing three major hydro-power projects on Indus River which include Nimoo Bazgo power project, Dumkhar project and Chutak project. On the other hand, it has started Kishan Ganga hydropower project by diverting the waters of Neelum River, a tributary of the Jhelum, in sheer violation of the IWT. The gratuitous construction of dams by India has created serious water shortages in Pakistan. The construction of Kishan Ganga dam will turn the Neelum valley, which is located in Azad Kashmir into a barren land. The water shortage will not only affect the cultivation but it has serious social, political and economic ramifications for Pakistan. The farmer associations have already started protests in Southern Punjab and Sindh against the non-availability of water. These protests are so far limited and under control. The reports of international organizations suggest that the water availability in Pakistan will reduce further in the coming years. If the situation remains unchanged, the violent mobs of villagers across the country will be a major law and order challenge for the government. The water shortage has also created mistrust among the federative units, which is evident from the fact that the President and the Prime Minister had to intervene for convincing Sindh and Punjab provinces on water sharing formula. The Indus River System Authority (IRSA) is responsible for distribution of water among the provinces but in the current situation it has also lost its credibility. The provinces often accuse each other of water theft. In the given circumstances, Pakistan desperately wants to talk on water issue with India. The meetings between Indus Water Commissioners of Pakistan and India have so far yielded no tangible results. The recent meeting in Lahore has also ended without concrete results. India is continuously using delaying tactics to under pressure Pakistan. The Indus Water Commissioners are supposed to resolve the issues bilaterally through talks. The success of their meetings can be measured from the fact that Pakistan has to knock at international court of arbitration for the settlement of Kishan Ganga hydropower project. The recently held foreign minister level talks between both the countries ended inconclusively in Islamabad, which only resulted in heightening the mistrust and suspicions. The water stress in Pakistan is increasing day by day. The construction of dams will not only cause damage to the agriculture sector but India can manipulate the river water to create inundations in Pakistan. The rivers in Pakistan are also vital for defense during wartime. The control over the water will provide an edge to India during war with Pakistan. The failure of diplomacy, manipulation of IWT provisions by India and growing water scarcity in Pakistan and its social, political and economic repercussions for the country can lead both the countries toward a war. The existent A-symmetry between the conventional forces of both the countries will compel the weaker side to use nuclear weapons to prevent the opponent from taking any advantage of the situation. Pakistan's nuclear programme is aimed at to create minimum credible deterrence. India has a declared nuclear doctrine which intends to retaliate massively in case of first strike by its' enemy. In 2003, India expanded the operational parameters for its nuclear doctrine. Under the new parameters, it will not only use nuclear weapons against a nuclear strike but will also use nuclear weapons against a nuclear strike on Indian forces anywhere. Pakistan has a draft nuclear doctrine, which consists on the statements of high ups. Describing the nuclear thresh-hold in January 2002, General Khalid Kidwai, the head of Pakistan's Strategic Plans Division, in an interview to Landau Network, said that Pakistan will use nuclear weapons in case India occupies large parts of its territory, economic strangling by India, political disruption and if India destroys Pakistan's forces. The analysis of the ambitious nuclear doctrines of both the countries clearly points out that any military confrontation in the region can result in a nuclear catastrophe. The rivers flowing from Kashmir are Pakistan's lifeline, which are essential for the livelihood of 170 million people of the country and the cohesion of federative units. The failure of dialogue will leave no option but to achieve the ends through military means. The only way to discard the lurking fear of a nuclear cataclysm is to settle all the outstanding disputes amicably through dialogue. The international community has a special role in this regard. It should impress upon India to initiate meaningful talks to resolve the lingering Kashmir dispute with Pakistan and implement the water treaty in its letter and spirit. The Indian leadership should drive out its policy towards Pakistan from terrorism mantra to a solution-oriented dialogue process. Both the countries should adopt a joint mechanism to maximize the utility of river waters by implementing the 1960 treaty, Besides negotiations with India, Pakistan should start massive water conservation and management projects. The modern techniques in agriculture like i.e. drip irrigation, should be adopted. On the other hand, there is a dire need to gradually upgrade the obsolete irrigation system in Pakistan. The politicization of mega hydropower projects/dams is also a problem being faced by Pakistan, which can only be resolved through political will.

#### Extinction.

Wickersham 10 Bill (University of Missouri adjunct professor of Peace Studies) “Threat of ‘nuclear winter’ remains New START treaty is step in right direction.” April 11th 2010 <http://www.columbiatribune.com/news/2010/apr/11/threat-of-nuclear-winter-remains/> JW

In addressing the environmental consequences of nuclear war, Columbian Steve Starr has written a summary of studies published by the Bulletin of the International Network of Engineers and Scientists Against Proliferation, which concludes: “U.S. **researchers have confirmed** the scientific validity of the concept of **‘nuclear winter’ and have demonstrated that** any conflict which targets **even a tiny fraction of the global arsenal will cause catastrophic disruptions of the global climate**.” In another statement on his Web site, Starr says: “**If 1% of the nuclear weapons** now ready for war **were detonated** in large cities, **they would utterly devastate the environment, climate, ecosystems and inhabitants of Earth. A war** fought with thousands of strategic nuclear weapons **would leave the Earth uninhabitable**.”

### 2NR Weighing

Outweighs on probability. Barlow[[1]](#footnote-1) ‘08

The three water crises – dwindling freshwater supplies, inequitable access to water and the corporate control of water – pose the greatest threat of our time to the planet and to our survival. Together with impending climate change from fossil fuel emissions, the water crises impose some life-or-death decisions on us all. Unless we collectively change our behavior, we are heading toward a world of deepening conflict and potential wars over the dwindling supplies of freshwater – between nations, between rich and poor, between the public and the private interest, between rural and urban populations, and between the competing needs of the natural world and industrialized humans. Water Is Becoming a Growing Source of Conflict Between Countries Around the world, more that 215 major rivers and 300 groundwater basins and aquifers are shared by two or more countries, creating tensions over ownership and use of the precious waters they contain. Growing shortages and unequal distribution of water are causing disagreements, sometimes violent, and becoming a security risk in many regions. Britain’s former defense secretary, John Reid, warns of coming “water wars.” In a public statement on the eve of a 2006 summit on climate change, Reid predicted that violence and political conflict would become more likely as watersheds turn to deserts, glaciers melt and water supplies are poisoned. He went so far as to say that the global water crisis was becoming a global security issue and that Britain’s armed forces should be prepared to tackle conflicts, including warfare, over dwindling water sources. “Such changes make the emergence of violent conflict more, rather than less, likely,” former British prime minister Tony Blair told The Independent. “The blunt truth is that the lack of water and agricultural land is a significant contributory factor to the tragic conflict we see unfolding in Darfur. We should see this as a warning sign.” The Independent gave several other examples of regions of potential conflict. These include Israel, Jordan and Palestine, who all rely on the Jordan River, which is controlled by Israel; Turkey and Syria, where Turkish plans to build dams on the Euphrates River brought the country to the brink of war with Syria in 1998, and where Syria now accuses Turkey of deliberately meddling with its water supply; China and India, where the Brahmaputra River has caused tension between the two countries in the past, and where China’s proposal to divert the river is re-igniting the divisions; Angola, Botswana and Namibia, where disputes over the Okavango water basin that have flared in the past are now threatening to re-ignite as Namibia is proposing to build a threehundred- kilometer pipeline that will drain the delta; Ethiopia and Egypt, where population growth is threatening conflict along the Nile; and Bangladesh and India, where flooding in the Ganges caused by melting glaciers in the Himalayas is wreaking havoc in Bangladesh, leading to a rise in illegal, and unpopular, migration to India.

### M/E War Scenario

#### Water crises cause Middle East war.

Mirak-Weissbach 2k Muriel (She worked with an international press service for many years and published hundreds of articles tthere as well as in other political and cultural journals, on topics related to development policy, the dialogue between Christianity and Islam and political events in the Arab and Islamic world. She reported at length on the Iranian nuclear energy program, including interviews with Iranian officials, the Israeli-Palestinian conflict and Armenian-Turkish relations. In 2007, she started writing for the online publication, , www.globalresearch.ca as well as a German magazine, Arab Forum. In 2009 she began publishing in Armenian media, and since 2013 has been the Berlin correspondent for the US-based weekly Armenian Mirror-Spectator.) “Solving the Water Shortage Is the Key to Mideast Peace” May 2000 The Schiller Institute <https://www.schillerinstitute.org/economy/phys_econ/phys_EIR-20_5-19-01.html> JW

When peace talks resume, between the Israeli and Syrian governments, there will be one central issue which must be faced, if progress is to be made. That issue is water. Similarly, as the Palestinian-Israeli track is revived, the same issue will be decisive. There can be no viable Palestinian state, no future perspectives for hundreds of thousands of returning Palestinian refugees, unless the basis is established for a productive, growing agricultural and industrial economy; and that requires water currently not available. President Bill Clinton has taken up the cause of peace among Arabs and Israelis, as a personal crusade, of sorts. All well and fine. But, the tragic irony in his well-meaning effort is, that his own State Department is just as committed to sabotaging the most viable approach to solving the water crisis, which is the massive application of nuclear-powered desalination plants throughout the region. To the extent that Clinton accepts the State Department's policy of technological apartheid--forbidding nuclear technology to the Arabs--and accepts the insane, free-market alternative, which is privatization of water, there will be no peace in the region. Instead, there will be war. Lyndon LaRouche, who has been campaigning for peace through development in the Middle East over decades, was the first to articulate a regional proposal pivotted on nuclear desalination, initially applied to the Palestinian-Israeli talks, now extended to talks between Tel Aviv and Damascus. On April 25, LaRouche commented, "There will be no Middle East peace unless, and until, the water issue, as I have defined this repeatedly since 1975, is finally adopted by the U.S. and relevant other parties involved in the negotiations." LaRouche said that he hoped President Clinton "would develop a clear understanding of this point and its implications; in the visible aspects of the negotiations so far, there is no evidence that he has yet come to an understanding of this problem." As a result, "The entire, otherwise feasible Middle East peace is going down the toilet--a waterless toilet," he said. LaRouche characterized this matter as of "next to the utmost urgency, inferior only to the urgency of moving toward a New Bretton Woods as I have defined it." Whether these polices would prevail, or not, he said, was a matter of sheer political will: "Sometimes, in history, the only obstacle to certain measures, lies within the stubborn refusal to accept a road to survival which happens to be contrary to one's previously established prejudices. The role of massive desalination programs is so obvious, respecting the feasibility of Middle East peace, that there could be no rational excuse for failing to situate the entire peace effort within the framework of a mass-desalination agreement and its prompt implementation." Figure 1 shows the extended area of the greater Middle East and Egypt, identifying national borders, and the few rivers of the region--one of the most arid in the world. Figure 2 gives more geographic detail for the five inner-core nations, as well as illustrating the concept of locating nuclear-powered desalination in the trans-Jordan and surrounding areas. - Land, and Water, for Peace - When Syrian Foreign Minister Farouk Shara'a met with Israeli Prime Minister Ehud Barak, for talks in Shepherdstown, West Virginia beginning on Jan. 3, negotiations broke off, ostensibly around the definition of the borders between the two states. While Barak demanded that the 1947 United Nations mandate map be used as a basis, Shara'a demanded that it be the cease-fire line, existing prior to the outbreak of the June 1967 war. The difference between the two, is a thin strip of land, along the shoreline of Lake Tiberias. In Israel's version, that strip would be under its control, whereas Syria's map shows its territory extending up to and including the eastern shoreline of the lake. Later, when President Clinton met Syrian President Hafez al-Assad in Geneva, and tried to sell him the same map as Barak's, Assad refused, and the talks ended abruptly. Clearly, Syria's demands for Israeli withdrawal from the Golan Heights, and restoration of its entire territory, are a matter of national sovereignty, not to be disputed. The reason why Israel insists on maintaining the shoreline, is, obviously, that it thereby gains access to the waters of the lake. - Water Wars - The simple truth of the matter is, that virtually every war fought in the region since 1947, has been over water, directly or indirectly; and anyone who denies this, is a liar or a fool. [Certainly the British have played geopolitical games, exploiting religious and ethnic fault-lines, but water access has always been the economic fulcrum for all such London strategems.] Following the 1948 Arab-Israeli War, Israel held land, including on the western shore of Lake Tiberias, as well as parts of the West Bank and Gaza. Israel started to establish a national water distribution system, taking water from Lake Tiberias, despite Arab and international protests. In 1964, Syria started a canal project, which would have rerouted water from the Hasbani and Banias Rivers (both of which feed the Jordan River in the north) around the Golan Heights, and into the Yarmuk River, where a dam was to be built by Syria and Jordan. This was a casus belli for clashes on the Israeli-Syrian border in spring of 1965, and, in 1966 and 1967, before the outbreak of the "Six Day War," Israeli Air Force planes bombed the construction site of the dam, as well as construction vehicles and roadways. It was in the June 1967 war, that Israel secured its "strategic reserves" of water: It occupied the Golan Heights, Gaza, and the West Bank. This meant annexing the source of the Banias, and controlling the flow of the Yarmuk. In the closing hours of the war, Israel bombed the dam to smithereens. Israel also controlled the north bank of the Yarmuk, at Hammat Gandar, thus controlling the flow of water into Jordan's East Ghor Canal. (Israel destroyed large parts of this canal two years later, by military means.) The lands seized in the 1967 war, corresponded to water sources, which Israel exploited. The water distribution system of Israel, known as the National Water Carrier (see Figure 2), which services its coastal cities and as well as its settlements in the Occupied Territories, took 20% of its supply from ground water from the western part of the Occupied Territories, another 20% from Israeli coastal groundwater, and the rest from Lake Tiberias, as well as water from the eastern side of the Occupied Territories, which is from the Jordan River. The water for Lake Tiberias, Israel pumped out of the Yarmuk River. Prior to the 1967 war, Israel had taken 80% of its water through drilling and wells. After the war, it accessed the new sources, and issued laws preventing Arabs from drilling wells. Finally, in 1982, Israeli invaded Lebanon and occupied the southern part, with its proxy force, the South Lebanese Army. Again, although the rationale was security, the reason for the move, was to be in a position to gain access to the waters of the Litani River, at the northern edge of the "security zone." As a result of the wars in the region, and the takeover of water sources, there has been a continuing deterioration of water supplies. At the same time, population growth, the influx of 300,000 refugees into Jordan from the Gulf War, and severe drought over the past years, have literally dried up the rivers--and the wells. The Israeli, Jordanian, and Palestinian populations have grown from 9 million to 12 million in the last decade. Syria's population, of 17.2 million, is growing at a rate of 3.15%. In Damascus, it is reported, tap water is available only 4-6 hours per day. Syria's freshwater supplies are being depleted, and the construction by Turkey, of a huge dam project in southeast Anatolia, is diverting massive amounts of Euphrates River water away from Syria.

### AT: Uses lots of water

#### 1. Desalinations solves – even if nuclear power requires water, desalinating the ocean provides a functionally infinite supply of fresh water which non uniques the link turn

#### 2. Prioritization solves – countries wont get themselves into a water crisis just to keep a few nuclear reactors on – worse comes to worse they’ll shut them down temporarily.

#### 3. I outweigh on probability – technology for power plants is improving – it’ll be possible to use less water over time, but desalination is only possible with reliance on nuclear power.

### NP K2 Water Shortages

#### Nuclear energy solves water shortages.

Brook et al 14 Barry W. Brook (Faculty of Engineering & Technology, University of Tasmania), Agustin Alonso, Daniel Menely, Jozef Misak, Tom Blees, Jan B. van Erp “Why nuclear energy is sustainable and has to be part of the energy mix” Sustainable Materials and Technologies November 12th 2014 JW

Nuclear energy is not limited to the generation of electricity, but may equally well be used for such important tasks as desalination, production of hydrogen, space heating and process-heat applications in industry as well as for extraction of carbon from CO2 to combine with hydrogen to create synthetic liquid fuels. Many of these alternative applications of nuclear energy will combine very well with the generation of electrical energy in that the reactors could be operated continuously at full power, allocating the required amount of heat to satisfy the electrical load demand and the rest for producing fresh water, hydrogen or steam for industrial processes [6]. Many areas around the world are already facing severe shortages of fresh water and it can be expected that the need for fresh water will be ever increasing. Nuclear-energy- driven desalination in coastal regions will be able to satisfy part of this need. Alternatively, nuclear power plants will be able to provide the energy to pump fresh water from areas with a surplus to regions facing a shortage.

#### Nuclear power’s key to desalinating water and solving shortages.

Science Daily 7 “Could Nuclear Power Be The Answer To Fresh Water?” November 20, 2007 Inderscience Publishers https://www.sciencedaily.com/releases/2007/11/071120082429.htm JW

Scientists are working on new solutions to the ancient problem of maintaining a fresh water supply. With predictions that more than 3.5 billion people will live in areas facing severe water shortages by the year 2025, the challenge is to find an environmentally benign way to remove salt from seawater. Global climate change, desertification, and over-population are already taking their toll on fresh water supplies. In coming years, fresh water could become a rare and expensive commodity. Research results presented at the Trombay Symposium on Desalination and Water Reuse offer a new perspective on desalination and describe alternatives to the current expensive and inefficient methods. Pradip Tewari of the Desalination Division at Bhabha Atomic Research Centre, in Mumbai, India, discusses the increasing demand for water in India driven not only by growing population and expectancies rapid agricultural and industrial expansion. He suggests that a holistic approach is needed to cope with freshwater needs, which include primarily seawater desalination in coastal areas and brackish water desalination as well as rainwater harvesting, particularly during the monsoon season. "The contribution of seawater and brackish water desalination would play an important role in augmenting the freshwater needs of the country." Meenakshi Jain of CDM & Environmental Services and Positive Climate Care Pvt Ltd in Jaipur highlights the energy problem facing regions with little fresh water. "Desalination is an energy-intensive process. Over the long term, desalination with fossil energy sources would not be compatible with sustainable development; fossil fuel reserves are finite and must be conserved for other essential uses, whereas demands for desalted water would continue to increase." Jain emphasizes that a sustainable, non-polluting solution to water shortages is essential. Renewable energy sources, such as wind, solar, and wave power, may be used in conjunction to generate electricity and to carry out desalination, which could have a significant impact on reducing potential increased greenhouse gas emissions. "Nuclear energy seawater desalination has a tremendous potential for the production of freshwater," Jain adds. The development of a floating nuclear plant is one of the more surprising solutions to the desalination problem. S.S. Verma of the Department of Physics at SLIET in Punjab, points out that small floating nuclear power plants represent a way to produce electrical energy with minimal environmental pollution and greenhouse gas emissions. Such plants could be sited offshore anywhere there is dense coastal population and not only provide cheap electricity but be used to power a desalination plant with their excess heat. "Companies are already in the process of developing a special desalination platform for attachment to FNPPs helping the reactor to desalinate seawater," Verma points out. A. Raha and colleagues at the Desalination Division of the Bhabha Atomic Research Centre, in Trombay, point out that Low-Temperature Evaporation (LTE) desalination technology utilizing low-quality waste heat in the form of hot water (as low as 50 Celsius) or low-pressure steam from a nuclear power plant has been developed to produce high-purity water directly from seawater. Safety, reliability, viable economics, have already been demonstrated. BARC itself has recently commissioned a 50 tons per day low-temperature desalination plant. Co-editor of the journal\*, B.M. Misra, formerly head of BARC, suggests that solar, wind, and wave power, while seemingly cost effective approaches to desalination, are not viable for the kind of large-scale fresh water production that an increasingly industrial and growing population needs. India already has plans for the rapid expansion of its nuclear power industry. Misra suggests that large-scale desalination plants could readily be incorporated into those plans. "The development of advanced reactors providing heat for hydrogen production and large amount of waste heat will catalyze the large-scale seawater desalination for economic production of fresh water," he says.

## California

### 1NC: Megadrought

#### El Niño made a dent in the drought but it’s still bad.

KTLA 3-17-16 “Dramatic Images Show Improved Drought Conditions in California Due to El Niño” <http://ktla.com/2016/03/17/dramatic-images-show-improved-drought-conditions-in-california-due-to-el-nino/> JW

No, California’s drought isn’t over. But this week, the state came to terms with the fact that the series of El Niño influenced storms has made a dent. State officials say it’s far too early to declare the drought over — especially given that the rains seem to have focused on Northern California, while Southern California has seen comparatively little rain. But reservoir levels are rising, along with the snowpack. Both are key sources of water for the state.

#### The Diablo Canyon Nuclear Power Plant in San Luis Obispo will solve the drought but it needs renovations.

Conca 15 James (scientist in the field of the earth and environmental sciences for 33 years, specializing in geologic disposal of nuclear waste, energy-related research, planetary surface processes, radiobiology and shielding for space colonies, subsurface transport and environmental clean-up of heavy metals. I am a Trustee of the Herbert M. Parker Foundation and consult on strategic planning for the DOE, EPA/State environmental agencies, and industry including companies that own nuclear, hydro, wind farms, large solar arrays, coal and gas plants. I also consult for EPA/State environmental agencies and industry on clean-up of heavy metals from soil and water. For over 25 years I have been a member of Sierra Club, Greenpeace, the NRDC, the Environmental Defense Fund and many others, as well as professional societies including the America Nuclear Society, the American Chemical Society, the Geological Society of America and the American Association of Petroleum Geologists.) “California's Mega-Drought: Nuclear Power To The Rescue” Forbes June 9th 2015 <http://www.forbes.com/sites/jamesconca/2015/06/09/californias-megadrought-nuclear-power-to-the-rescue/#5eaed45754b4> JW

The only power facility in California that does not use any of the state’s precious fresh water is the Diablo Canyon Nuclear Power Plant in San Luis Obispo County. And it can even produce additional freshwater for the nearby community. The nuclear plant desalinates ocean water using reverse osmosis and ultrafiltration. The nuclear plant depends on the desalination plant as its sole source of fresh water, used for the plant’s two nuclear reactors as well as all other water needs such as drinking water for its employees and irrigation of its grounds. Although a relatively small plant, Diablo Canyon’s seawater desalination plant is presently the largest operating desal facility on the West Coast, producing about 675,000 gallons of freshwater a day. But the desal facility is not running at maximum capacity. It can actually produce a million and a half gallons of fresh water a day, and can ramp up right now, with very little upgrade and additional costs. Diablo Canyon Nuclear Power Plant in San Luis Obispo County, California has had a seawater desalination plant for its entire existence, producing all of its fresh water needs from operations to cooling to irrigation to supplying drinking water to its employees. But it only uses about 40% of its capacity and is willing to use all of it to produce fresh water for the nearby community to help with the effects of the megadrought. After four consecutive years of drought, San Luis Obispo County sees the additional 825,000 gallons per day of freshwater production as key to helping it cope with the drought. Diablo Canyon’s desal facility will fall to second place in California when the commercial desalination plant in Carlsbad begins producing about 50-million-gallon-per-day in November. In addition, Santa Barbara is evaluating whether to restart its mothballed desalination plant. And the city of Marina Coast in Monterey Bay is planning to develop large desal capabilities. These would increase the state’s capacity to almost 100 million gallons per day. Desalination is not a new idea. Most of Abu Dhabi’s gas-fired power plants provide electricity to their huge desalination plants that deliver over a billion gallons of drinking water a day. Desalination is the country’s only source of drinking water. Pacific Gas and Electric Company, who owns the Diablo Canyon plant, is happy to maximize production at the desal plant. The main requirement is additional reverse osmosis filters and storage tanks, fairly easy considering that the system is highly modular and they have plenty of space. In addition, a water pipeline is needed to connect the plant to the water users in town.Of course, there’s no such thing as a free lunch. Opponents to desalination complain that there are significant environmental issues. I’m not sure I’d call them significant, since these issues are nowhere near as bad as continued depletion of groundwater and the effects of the drought itself. Also, they can easily be addressed. The seawater intake pipes can drag in and kill small ocean organisms, but proper filters can fix that. Even better, the intake pipes can be placed under the ocean floor to use the sediment as a natural filter. And the volume of water is comparatively small compared to the local area around the intake. About half of the seawater that is treated in a desalination plant becomes fresh water. The salt removed stays in the other half, doubling the saltiness of the wastewater and making it a brine. The brine is generally returned to the ocean, as Diablo Canyon does, where it is quickly diluted back to normal. The claims that the cost of desalination is huge and energy-intensive are also a bit overblown. The cost is certainly higher relative to river and groundwater that just need to be pumped to users. But relative to the effects of the drought, a fraction of a cent per gallon just isn’t that much. Buying RO water from the supermarket costs about 40¢/gallon, so the public should not be too upset at a fraction of a cent per gallon to address something as grave as a megadrought. The amount of electricity needed to desalinate seawater is also pretty low, only about 1 kWh per 100 gallons of drinking water produced (WRA). A kWh costs an average of 12¢ in America, so this is a tenth of a cent per gallon. But the Canyon Diablo nuclear plant produces this electricity at only 4¢/kWh, cheaper than most other energy sources in California, so the cost is even less. If desalination were to increase significantly in the state, monthly water bills might rise $10 or so. This is not much of a price to pay to ward off the worst effects of a megadrought. And new desal plants can be kept in reserve for when they are needed most, as was the case with Santa Barbara’s mothballed plant. Of course, we should exhaust all other options at the same time, particularly reusing wastewater, and capturing and treating stormwater runoff. California only reuses 9 percent of its wastewater. While this is far ahead of other states, it’s only scratching the potential surface. Significant increase of wastewater treatment across California could provide over a hundred million gallons a day to the drought-stricken state. But right now, this nuclear power plant can contribute to helping with this drought.

#### The drought will wreck California biodiversity—waterbirds, native fish, and wildfires.

Hanak et al 15 Ellen Hanak (Centor Director and Senior Fellow), Jeffrey Mount (Senior Fellow), Caitrin Phillips Chappelle (Associate Center Director), Jay Lund (Adjunct Fellow, Public Policy Institute of California), Josué Medellín-Azuara (Senior Researcher, University of California, Davis, Center for Watershed Sciences), Peter Moyle (Associate Director, University of California, Davis, Center for Watershed Sciences), Nathaniel Seavy (Research Director, Pacific Coast and Central Valley, Point Blue Conservation Science) “What If California’s Drought Continues?” Public Policy Institute of California August 2015 <http://www.ppic.org/main/publication_quick.asp?i=1160> JW

The most acute and severe impacts of this drought so far are on California’s freshwater habitats and forested lands and on the biodiversity they support. These impacts stem, in part, from the severity of the drought and its combination of low flows and heat. More than a century of water and land practices have increased vulnerability by undermining the natural capacity of these ecosystems to handle occasional droughts.46 The environment doesn’t have the same kinds of adaptation tools as other sectors—it generally can’t pump more groundwater in dry times, for example.47 But this troubling situation also reflects less investment in building drought resilience for the environment. California was unprepared for this environmental drought emergency and is now struggling to implement stopgap measures. Here, we focus on three major management challenges of continued drought: risks to waterbirds of the Pacific Flyway from loss of wetlands, risks to native fishes from conditions in rivers and streams, and the growing potential for extreme wildfires.48 Near-term water and land management changes can help address the urgent problems for waterbirds and fish, but this will require additional emergency funding. WATERBIRDS California is home to diverse populations of ducks, geese, shorebirds, and herons [waterbirds] and is an essential stopping point on the Pacific Flyway. Wetlands in northeastern California and the Central Valley provide winter habitat for more than five million waterbirds.49 Twentieth century land development drained most natural wetlands, so these birds now rely on a network of managed wetlands—intentionally flooded areas in federal and state refuges and on private lands.50 They also make extensive use of flooded farmland, most notably rice farms that are flooded in the fall and winter to break down rice straw.51 Impacts and Adaptations So Far The drought has dramatically reduced the amount of waterbird habitat. Water deliveries to refuges—already tight in normal times—were cut by 25 percent or more, and the sharp drop in rice acreage reduced the availability of flooded farmland.52 In addition to reducing food supplies, reduced wetland habitat increases risk of disease because crowding can decrease water quality. California was unprepared for this environmental drought emergency and is now struggling to implement stopgap measures. So far, management actions and lucky timing of late spring rains have helped stave off major declines in bird populations. Close coordination between wildlife refuges across California in the past year has also helped ensure that limited water is distributed to wetlands when it can provide the greatest habitat value for birds. Another promising effort is paying farmers to make small adjustments in the timing and duration of flooding fields. For modest amounts of money, these "pop-up habitats” can be strategically located to make the most use of limited water availability. The Nature Conservancy’s BirdReturns is one such program, supported to date with philanthropic sources.53 Federal funds support a similar program run by the Natural Resources Conservation Service.54 These programs are prime examples of adaptively managing scarce resources to create a high return on investment. If the Drought Continues Risks of high bird mortality are [is] increasing as the drought wears on. The Nature Conservancy estimates that refuges may face larger water cutbacks this coming winter, and that temporary wetlands in rice fields may be reduced by more than 85 percent.55 Absent rains, food for ducks and geese will become critically scarce this coming fall precisely during the peak of bird migration.56 A continuation of current management efforts can help reduce ongoing drought impacts, but this will require dedication of both refuge water supplies and funds for purchasing farm water, which may become more costly as the drought wears on. NATIVE FISHES California is home to 129 species of freshwater fish, two-thirds of which are found only in the state. One hundred of these fishes are either already listed as threatened or endangered under federal and state Endangered Species Acts or in decline and on their way to being listed in the future.57 Many are highly vulnerable to low flows and higher water temperatures, and this drought is taking a major toll. Impacts and Adaptations So Far Since 2013, rivers and streams throughout the state have been at record or near-record lows, with many waterways that would normally flow year-round becoming a series of disconnected pools or drying up (technical appendix Figure A4). Higher temperatures have increased stress on fishes, most notably salmon and trout, as well as some amphibians. Survey counts for estuarine fish such as delta smelt and longfin smelt are at or near record lows. Emergency management actions have included drought-stressor monitoring and rescue operations by the Department of Fish and Wildlife (technical appendix Table A8). In several key salmon and steelhead streams, the State Water Board has ordered some water users to stop diversions or to reduce groundwater pumping that was depleting surface flows.58 But, as noted above, the board has also relaxed environmental flow standards on 35 occasions to accommodate urban and farm users (technical appendix Table A1). While water managers have sought to manage the timing of flows in ways that benefit both fish and other water users, they have not always had that option. The drought has posed difficult trade-offs in managing scarce surface water, where goals of water supply, water quality, and fish flows often compete. This is best illustrated by ongoing efforts to preserve the 2015 cohort of winter-run Chinook salmon below Shasta Reservoir. Unplanned releases of warm water in 2014 caused a near-complete loss of wild-spawning winter-run eggs and fry.59 Decisions made this year are likely to lead to a similar result, pushing this species very close or possibly to extinction. Restrictions on releases from Shasta Reservoir to try to correct these mistakes are affecting operations of Oroville and Folsom Reservoirs, reducing agricultural and urban supplies and making it difficult to meet salinity standards for water exports from the Delta. If the Drought Continues Eighteen native fish species appear to be at high risk of extinction in the wild, including most runs of salmon and steelhead and a diverse group of other fishes that reside in watersheds across the state.60 Reasons include loss of rearing or spawning habitat due to reduced flows (an issue for all 18 species) and increased water temperatures (an issue for salmon, steelhead, and several other fish including delta smelt). The drought is also favoring conditions for invasive species that reduce the quality of habitat for some fish. For some salmon runs, an added stressor is the release of large numbers of hatchery-bred fishes, which can harm drought-stressed wild fish through competition, predation, or interbreeding that reduces the fitness of their offspring. Beyond the fish rescue and monitoring efforts noted above, there is no comprehensive plan to address the potential for extinctions. The drought has posed difficult trade-offs in managing scarce surface water, where goals of water supply, water quality, and fish flows often compete. Near-term options for improving habitat in the wild are limited but could help in some cases. For instance, managing some smaller watersheds as refuges by restricting diversions and focusing restoration efforts could help some salmon runs. Better enforcement efforts may also help, especially where illegal diversions to marijuana farms and vineyards are depleting North Coast streams.61 And more generally, allowing a greater margin of safety on environmental flows for fish earlier in the season could improve chances of fish survival, though this would reduce availability of water for farms and cities. Creative approaches to acquire water and use it strategically, as in the BirdReturns case, could reduce conflict. Although the Department of Fish and Wildlife has tried to secure additional flows through voluntary agreements, the response has been limited. A sustained effort utilizing emergency funding to purchase water in selected watersheds may be needed to prevent extinctions.62 For many of these fish, it will also be prudent to develop a plan for protecting the species in captivity and rebuilding populations following the drought. This would mean expanding the state’s program of conservation hatcheries—those specifically run to protect biodiversity. This would require rapid and substantial investments of resources because the state currently lacks the facilities, funding, and technical expertise to systematically pursue such an approach.63 This approach would also be controversial because it would likely require shifting most current hatcheries away from producing fish for commercial and recreational fisheries, which are already taking a financial hit from fewer fish during this drought.64 FORESTS AND WILDFIRES Conifer and hardwood forests cover roughly a quarter of California. These forests are naturally wildfire prone, and a century of suppressing fires has made them much denser, increasing the likelihood of large, devastating fires.65 Impacts and Adaptations So Far Hotter temperatures, moisture deficits, and insect infestations are killing trees at a rapid pace. These conditions lead to severe wildfires, posing significant threats to public safety, power lines and other infrastructure, water supply, air quality, and wildlife. Since the start of this drought, California has experienced two of the three largest fires in recorded history (technical appendix Figure A9). When fires burn hot over large areas—as in the 2013 Rim Fire in and near Yosemite National Park—there is also a concern that conifer forest ecosystems may not recover. CALFIRE’s strategy for this drought, in partnership with federal and local authorities, is to reduce the potential for large, destructive fires by suppressing fires as quickly as possible. If the Drought Continues California faces significant risk of more devastating fires like the Rim Fire over the next two to three years. Given the scale of wildfire risk, CALFIRE’s fire suppression strategy is the only real near-term option. But this strategy could become harder as the drought wears on and forest conditions degrade. Management options to reduce severe fire risk will be of limited value in the short term, given the problem’s vast scale. Fuel reduction efforts that can reduce fire intensity—including thinning and reintroduction of more frequent, low-intensity fires—require sustained efforts over large areas for decades. Although some efforts are underway on private lands, fuel reduction efforts on federal land—roughly half the forested lands in California—have proven difficult for a variety of reasons, including permitting.66

#### California’s a biodiversity hotspot.

Hart et al 13 Caryl Hart, Ph.D, and Jackson Vanfleet-Brown “Biological Diversity” California Department of Parks and Recreation 2013 <http://www.parks.ca.gov/?page_id=26111>

A single California valley might contain several microclimates. In the fog belt it might be drizzly and misty all day long, even while a mile or two away the sun is shining in the banana belt. When comparing networks of valleys, California sees just as much diversity. Redwood groves meet grassland meadows, snowy mountains fall to desert floors, and temperate belts facilitate year-round agriculture. This is one of the reasons California is teeming with tall trees and diverse and plentiful ocean life. It’s a state full of biodiversity hotspots—areas where microclimates and evolution have fostered pockets of rare plants and animals. Yet microclimates are sensitive to changes in temperature and precipitation. Small climate changes have a big impact. This is one of the reasons hotspots will suffer as climate change continues. There is growing conviction among conservation biologists that greater biodiversity also confers greater resilience within ecosystems. Resilience refers to the ability of an ecosystem to maintain its functions in the face of disturbance. A climate resilient ecosystem would retain its functions and ecosystem services in the face of climate change. In fact, state parks in California represent the “hottest of hotspots” by protecting ever more endangered plant and animal species. By preserving these ecosystems, we help address climate change. In addition, parks create buffers around hotspots. By providing open space zones around critical habitats, resiliency is increased. These buffers assist ecosystems in their struggle to maintain balance. Preservation not only makes biodiversity hotspots more resilient to change, but buffers provide plants and animals with space to expand and shift. California State Parks also connect habitats, providing opportunities for displaced species to relocate. In light of climate change, many species are beginning to seek higher elevation habitats where precipitation and temperature now mimic the climate in lower region. As species move, they will need protected corridors to migrate. Climate change poses a particular threat to existing wildlife corridors. Businesses and homes may have to move, posing new development threats to open spaces. By connecting high elevation hills to the beach, and linking valleys together, parks preserve corridors from development.

#### Key to global biodiversity.

Conservation International 13 “Hotspots” 2013 http://www.conservation.org/how/pages/hotspots.aspx

Life on Earth faces a crisis of historical and planetary proportions. Unsustainable consumption in many northern countries and crushing poverty in the tropics are destroying wild nature. Biodiversity is besieged. Extinction is the gravest aspect of the biodiversity crisis: it is irreversible. While extinction is a natural process, human impacts have elevated the rate of extinction by at least a thousand, possibly several thousand, times the natural rate. Mass extinctions of this magnitude have only occurred five times in the history of our planet; the last brought the end of the dinosaur age. In a world where conservation budgets are insufficient given the number of species threatened with extinction, identifying conservation priorities is crucial. British ecologist Norman Myers defined the biodiversity hotspot concep**t** in 1988 to address[es] the dilemma that conservationists face: what areas are the most immediately important for conserving biodiversity? The biodiversity hotspots hold especially high numbers of endemic species, yet their combined area of remaining habitat covers only 2.3 percent of the Earth's land surface. Each hotspot faces extreme threats and has already lost at least 70 percent of its original natural vegetation. Over 50 percent of the world’s plant species and 42 percent of all terrestrial vertebrate species are endemic to the 34 biodiversity hotspots.

#### Every species loss pushes us closer to the brink.

Diner 94 David N. (Major, U.S. Army) "The Army and the Endangered Species Act: Who's Endangering Whom?" Judge Advocate Officer Graduate Course (April 1994) www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA456541&Location=U2&doc=GetTRDoc.pdf

Biologically diverse ecosystems are characterized by a large number of specialist species, filling narrow ecological niches. These ecosystems are inherently more stable than less diverse systems: "'The more complex the ecosystem, the more successfully it can resist a stress...[l]ike a net, in which each knot is connected to others by several strands, such a fabric can resist collapse better than a simple, unbranched circle of threads which if cut anywhere breaks down as a whole." By causing widespread extinctions humans have artificially simplified many ecosystems. As biological simplicity rises, so does the risk of ecosystem failure. The spreading Sahara desert in Africa, and the dustbowl conditions of the 1930s in the U.S. are relatively mild examples of what might be expected if this trend continues. Theoretically, each new animal or plant extinction, with all its dimly perceived and intertwined affects, could cause total ecosystem collapse, and human extinction. Certainly, each new extinction increases the risk of disaster. Like a mechanic removing, one by one, the rivets from an aircraft's wings, mankind may be edging closer to the abyss.

#### Extinction.

Takacs 96 David (Environmental Humanities Prof @ CSU Monteray Bay) “The Idea of Biodiversity: Philosophies of Paradise” pg. 200-201 1996

So biodiversity keeps the world running. It has value and of itself, as well as for us. Raven, Erwin, and Wilson oblige us to think about the value of biodiversity for our own lives. The Ehrlichs’ rivet-popper trope makes this same point; by eliminating rivets, we play Russian roulette with global ecology and human futures: “It is likely that destruction of the rich complex of species in the Amazon basin could trigger rapid changes in global climate patterns. Agriculture remains heavily dependent on stable climate, and human beings remain heavily dependent on food. By the end of the century the extinction of perhaps a million species in the Amazon basin could have entrained famines in which a billion human beings perished. And if our species is very unlucky, the famines could lead to a thermonuclear war, which could extinguish civilization.” 13 Elsewhere Ehrlich uses different particulars with no less drama: What then will happen if the current decimation of organic diversity continues? Crop yields will be more difficult to maintain in the face of climatic change, soil erosion, loss of dependable water supplies, decline of pollinators, and ever more serious assaults by pests. Conversion of productive land to wasteland will accelerate; deserts will continue their seemingly inexorable expansion. Air pollution will increase, and local climates will become harsher. Humanity will have to forgo many of the direct economic benefits it might have withdrawn from Earth's well¬stocked genetic library. It might, for example, miss out on a cure for cancer; but that will make little difference. As ecosystem services falter, mortality from respiratory and epidemic disease, natural disasters, and especially famine will lower life expectancies to the point where can¬cer (largely a disease of the elderly) will be unimportant. Humanity will bring upon itself consequences depressingly similar to those expected from a nuclear winter. Barring a nuclear conflict, it appears that civili¬zation will disappear some time before the end of the next century - not with a bang but a whimper.

### 1NC: Diablo Canyon CP

#### Counterplan: the United States federal government will update the Diablo Canyon Nuclear Power Plant in San Luis Obispo county with additional reverse osmosis filters, storage tanks, proper filters, and a water pipeline.

#### Mutually exclusive—it’s a nuclear power plant that the aff bans.

### 1NC: Diablo Canyon PIC

#### Counterplan: [countries ought to prohibit the production of nuclear power] with the exception of the Diablo Canyon Nuclear Power Plant in San Luis Obispo county, and the United States federal government will update the plant with additional reverse osmosis filters, storage tanks, proper filters, and a water pipeline.

#### Mutually exclusive—it’s a nuclear power plant that the aff bans.

1. **Barlow 8**—National chairperson of The Council of Canadians. Co-founder of the Blue Planet Project. Chairs the board of Washington-based Food & Water Watch and is also an executive member of the San Francisco–based International Forum on Globalization and a Councillor with the Hamburg-based World Future Council. She is the recipient of eight honorary doctorates. Served as Senior Advisor on Water to the 63rd President of the United Nations General Assembly (Maude, The Global Water Crisis and the Coming Battle for the Right to Water, 25 February 2008, http://www.fpif.org/articles/the\_global\_water\_crisis\_and\_the\_coming\_battle\_for\_the\_right\_to\_water) [↑](#footnote-ref-1)