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Appraisal of Sand Mining Activities at Ado Ekiti, Ekiti State Nigeria

Sanmi Adeoti (Mnitp, Rtp)[1] Anthony Peter (Mnia)[2]

[1]*Senior Lecturer Department of Urban and Regional Planning, The Federal Polytechnic, Ado Ekiti e- Mail: adeoti.sanmi@yahoo.com*

[2]*Principal Lecturer Department of Architectural Technology, The Federal Polytechnic, Ado Ekiti e- Mail: anthonypeter56@yahoo,com*

Abstract:

Sand which is a major component of soil being formed by rock erosion over thousands of years is globally known as an indispensable natural resource. This no doubt makes the sand mining activities to face numerous challenges of which the process affects not only its surroundings but also cause environmental damage worldwide The general overview of the sand mining and marketing makes this paper to examine the trend and volume of sand mining, to determine the socio economic implication and the environmental impacts of this activity at Ado Ekiti. The methodology involved the collection of data through oral interview and questionnaire that were subjected to descriptive analysis. The result of findings noted that increasing sand mining activities which promote development and income revenue generally continue to reduce the vegetation of most of the mining communities to levels that are destructive to biological diversity. In order to reduce the negative impacts of sand mining in a way to limits environmental damage during exploitation and restores the land after mining operations are completed calls for a holistic approach in community resource management.

Key words: Mining Development Degradation Environment Management,

Introduction

Soil is the uppermost surface of the earth and a natural resource which is made up of sand, clay and silt materials. It is noted that sand as a major component of soil natural resources is regarded as underground geological resource formed through weathering and erosion of both rocks and mountains by streams and rivers over time. Hence, land, oceans, rivers, streams, flood plains or hills become the major sources of sand and consider as non-renewable natural resource in terms of human life scale but renewable resource in terms of geological time

scale. As explained in [1] soil is considered as a mineral to protect the environment, a buffer to strong tidal waves and storms at the same time the habitat for crustacean species and marine organisms..

Sand mining is considered as a process of removal of sand from a place of their occurrence The process as pointed out in [2] could be in an open areas, beaches, inland dunes, mountain sides as well as riverbeds and banks where river sand is extracted. The mining of these products occur both on small and large-scale depending on the needs volume of extraction and the extent of availability.

The increase in demand for sand as construction material for physical development has placed immense pressure on sand resources, therefore making the practice and process of mining to become an environmental issue. In fact, the extractions of this important construction aggregate normally cause environmental degradation on the environs of their occurrence and also a threat to biodiversity of the environment.

Based on this development the paper aims to assess and evaluate environmental impact of sand mining within Ado-Ekiti metropolis so as to establish the trend and the current state of sand mining in Ado Ekiti and its environ, to estimate the volume of sand extraction with its social economic implications and to assess the environmental impacts of sand mining in the areas.

Conceptual Framework and Review of Literature

The conceptual framework for the study is based on the four wheel of sand mining activity which is the Human needs, Available resources, Institutions and the Environment. The four prominent and potential factors are not only interactive but closely interrelated with each other as in [Figure 1]. However these principal drivers do not only determine future land use patterns and natural resource potential but equally lead to higher levels of social and economic wellbeing and the level of air pollutant.

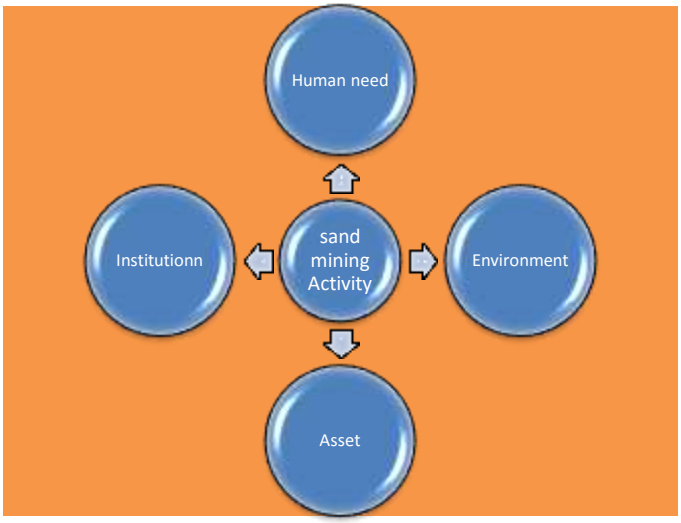

Figure 1 The Wheel of Sand Mining

Presently the world population exceeds 7.5 billion and is expected to reach 8.5 billion by 2030 and 11.2 billion in 2100 [3] This continuing population growth as pointed in [4] is expected to add 2.5 billion people to the world's urban population by 2050 with the highest percentage in developing countries. The continuous global population growth and the rapid increasing rate of urbanization across the globe particularly in developing countries as in [5] is not only a major cause for sand demand for many industries and infrastructure development but equally responsible for unsustainable extraction of sand from many illegal sand mining pits

The dimensions of impact of sand mining activities which are both positive and negative in nature are noted to be in physical, economic social and environmental forms. The socio-economic issues reflect on the positive impact of the sand mining in term of benefits and opportunities. This makes sand mining activities as pointed by [6] [1] to bring wealth and create employment for families at mining sites at the same time generate revenue and source of income to the people within the community and local governments of the mining site particularly in Africa's developing nations. The building of quality permanent structures and infrastructural development equally promote the benefit of sand mining in countries like Nigeria, Zimbabwe and Botswana [6] [7]

. Generally, the negative impact in sand mining activities is attributed to physical and environmental damages. For instance, as in [8] [9]. the physical aspect is noted with complete removal of vegetation and destruction of the soil profile of the mining communities

particularly during the large-scale mining activities This no doubt has led to the massive destruction of bio diversity of the environment This deliberate deforestation of an area for mining development as explained by [10] [11] [12] in most cases cause the elimination of some plants and exodus of some animal and bird species that feed on such plants or depend on them for cover .At the same time, the negative effect of environmental impact has to do with issues such as noise, truck traffic, dust, stream-water quality, reclamation, biodegradation, pollution and visually unpleasant landscapes [13].

Mining of mineral resources as pointed out by [14] is under the exclusive list of the Federal Government of Nigeria and no State or Local council has right to explore, prospect or exploit mineral resources found in their territory without licence from the Federal Government. Unfortunately the mining sector in Nigeria has been characterized over the years by failed policies, underinvestment, neglect and stagnation therefore making the sector to practically collapse as a result of dominance of artisanal, small scale and illegal miners whose activities made very little, if any, impact on Nigeria's GDP [15]. In its effort to revive the sector, the Federal Government of Nigeria introduces a lot of reforms in the solid mineral resource sector which culminated in the 2007 Minerals and Mining Act [16].

Study Area and Methods

The Study Area: The study area is in Ado Ekiti, the capital of Ekiti State in Nigeria. The city is located between Latitude 7°4'and 7º12' North of the Equator, 5°15′ and 5º16' East of the Greenwich Meridian. It falls within the Rain Forest Zone or the Lowland Forest Zone of Nigeria. The city experienced a rapid population growth that contributes to its spatial expansion as it became the State capital. For instance, the population of the city that was less than 200,000 before the creation of state is now about 400,000 while the spatial expansion increased from 19.6 km^2 in 1996 to 36.7 km^2 in 2006 [17]

The focus of the study is on sand mining activities of which the rate of physical development has a significant impact on the city. This in turn made the operation of sand and gravel mining activities that was under a Union known as Tipper Owners and Suppliers Association in the past to metamorphose into three bodies, namely The Tipper Owners Association; Tipper Drivers Union and the various Supplier Associations, At the same time the number of active tipper lorries in the town before the creation of the state in 1996 that was less than

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thirty is now over one thundered. It is also noted that the mining sites before the creation of state were five, and all located within the fringe of city but presently, all the active mining sites serving the city which are fifteen in numbers are scattered in farmland of neighbouring towns particularly Afao Ijan and Iworoko farmland. [Figure. 2].

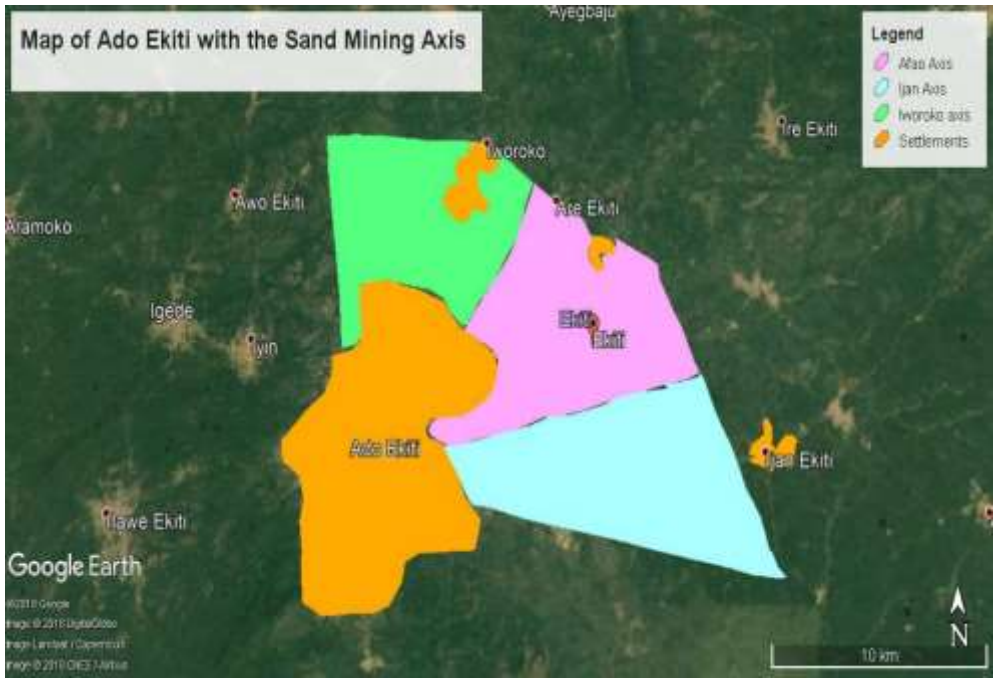

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Figure 2The Imagery Mapof Ado Ekiti Environ

Methodology: The study is purely based on purely descriptive statistics of which data were obtained from both primary and secondary source. The various Journals, text books from library and internet services remain the source of secondary data while structure interview and questionnaire serve as source of primary data. The structure oral interviews were conducted with the Chairmen of various Unions. At the same time, 165 questionnaires representing 10% of the total population of sand suppliers was designed for the study. These were randomly distributed among the suppliers to collect data on the mode and the various challenges of sand mining activity. The collected data were subjected to analysis and presentation.

Results and Discussion

Results

The results of finding for the study are purely descriptive analysis that focuses on four major issues. These are the state policy guideline; the background of the sand suppliers; the dimensions of mode operation for sand supplier; and the rating of environmental effect of sand mining operation.

The background of respondents: The [Table 1] clearly shows that female constituted the majority of the suppliers with 71.5 percent. The table also reveals that the age of the majority (75.8%) fall between 25 years and 50 years while the married respondents have the highest percentage. At the same time, the table shows that secondary education is the highest qualification of many respondents with 53.3 percent. In fact, according to the table 41.2 of the respondents consider the activity as their major source of income.

Table 1: Background of sand suppliers

Data / Frequency		Number	Percent
Sex	Male	47	28.5
	Female	118	71.5
	Total	165	100
Age	Less than 25 yrs	9	5.4
	(25- 50) yrs	125	75.8
	Above 50 yrs	31	18.8
	Total	165	100
Marital Status	Single	17	10.3
	Married	119	71.5
	Neither	30	18.2
	Total	165	100
Qualification	Primary	25	15.2
	Secondary	88	53.3
	Tertiary	52	31.5
	Total		
Income	Main source	45	27.3
	Major source	68	41.2
	Minor source	52	31.5
	Total		

The Sand Mining Location and Processing There are three major current sand mining axes for Ado Ekiti namely Afao, Ijan and Iworoko. It is noted that Ijan axis has highest number of sand mining sites out of which five are inland and one is river [figure 3]. Iworoko axis equally has five mining sites which are made up of three inland and two river sites. However, Afao axis is noted for inland sand mining only.

Information collected through interview from Ekiti Mining Agency reveals that mining processing in these locations are in accordance with the Minerals and Mining Act 2007 and the Mineral and Mining Regulations, 2011 of Nigeria. This actually involves the payment of fixed amount of money for cadastral services in the cadastral office and payment of annual Royalty and charges for the issuance of licence by the Mines Environmental Compliance Department. Other payments include haulage charges by the state government and levies by the owners of site farmland. It is also noted that both the Mines Inspectorate Department (MID) and Ekiti state Mining Agency are made to ensure that mining operators adhere strictly to the laws and regulations in the course of their mining operations

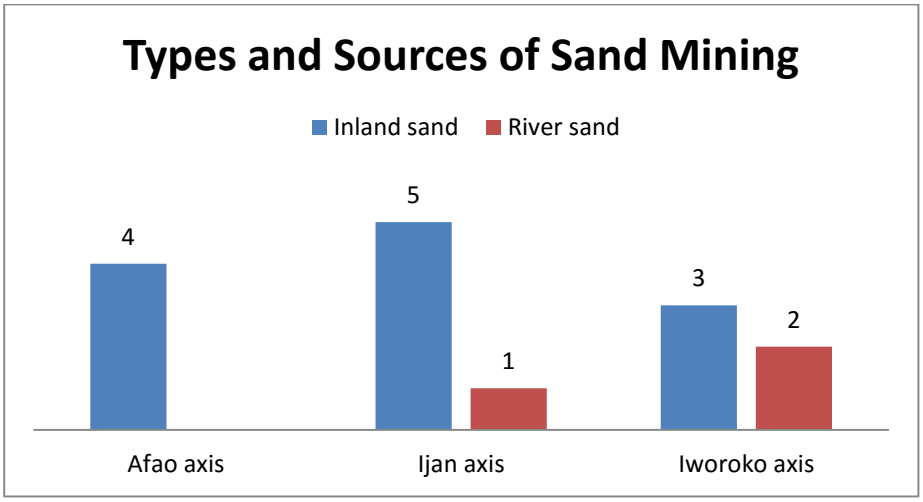

Figure 3 Types and Sources of Sand Miing

Mode of Operation and Intensity: The [Table2] below clearly shows that most of the respondents who are about 91 percent have no mining equipments such as Tippers or purchase a sand mining site which could be considered as resources for the mining operation. In fact, less than 1 percent of the respondent is considered to have both the Tipper and have a sand mining site of their own. As for the period of operation, it is equally shown that 50.1 percent of respondents do not operate on daily trips while those who made many daily trips stands at12.7 percent. It is also on record as shown in [Table 2] that 57.6 percent of respondents considered building construction activity as the major market for sand mining.

Table 2: Mode of Operation

		No	%
Operation Capacity	Having Tipper only	12	7.3
	Having mining site only	2	1.2
	Have both	1	0.6
	Having none	150	90.9
	Total	165	100
Operation Modality	Many trips daily	21	12.7
	A trip daily	58	35.2
	Occasional trips only	86	50.1
	Total	165	100
Operation Market	Block Industry	54	32.7
	Building Construction	95	57.6
	Others	16	9.7
	Total	165	100

The finding of study carried out in 2015 as explained in [18] made the mining intensity at Ado-Ijan to fall between the least shallow elevation of 345m and385m with a total volume 1342500m^3 At the same time the study explained that the intensity at Ado-afao mining areas clearly indicated that the elevation fall between 190m and 356m with a volume of 362400m^3 [figure 3] [figure 4].

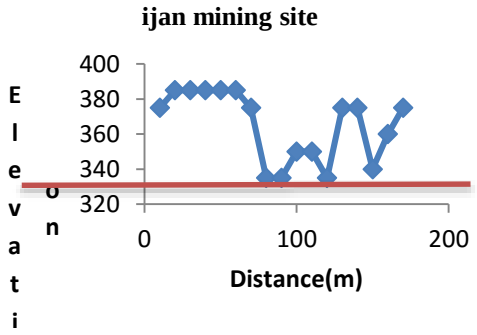

Fig 4 Mining intensity at Ijan

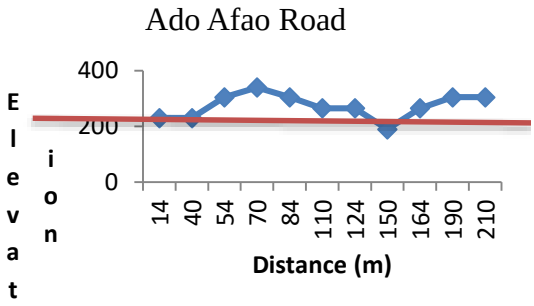

Fig 5 Mining intensity at Afao

The rating of the sand mining activity at Ado Ekiti as reveals in [table 3] indicates that 58.2 percent totally agree of its contribution to land degradation and erosion while 44.9 percent totally disagree that it is a threat to farming activities. According to the table, 44.8 Percent totally agree that it enhances government revenue while 59.4 percent partially agree that it promotes development. At the same the table clearly shows that 66.7 percent partially agree

of its environmental pollution and 48.5 percent disagree that the mining policy has societal benefit.

Table 3: The Rating of Sand Mining

Rating / Activity impact	Totally agree		Partially agree		Totally disagree	
	No	%	No	%	No	%
Contributes to land degradation/erosion	96	58.2	60	36.4	9	5.4
It contributes to employment	32	19.4	83	50.3	50	30.3
It enhance government revenue base	74	44.8	49	29.7	42	25.5
It is a threat to farming activity	50	30.3	41	24.8	74	44.9
It promotes development	57	34.5	98	59.4	10	6.1
It adds to environmental pollution	19	11.5	110	66.7	36	21.8
The mining policy has societal benefits	34	20.6	51	30.9	80	48.5

Discussions

The fact that Ado Ekiti experienced rapid physical development as a result of increasing population growth actually contributed to the rate of market demand for sand which happens to be a major material for physical development. This actually supported [19] assertion that the demand for sand is increasing because its importance and role in construction which is indispensable. It is also noted that this phenomenon does not only create avenue for many people to be in the business of sand supplier but make the increasing trend to manifest in formation of different associations within a short period of time. In fact, apart from the numerous sand suppliers, sand loaders and drivers who are directly involved in sand mining business as seen in [plate 1] other people working in road and building construction as well a block industry where sand is mostly used made the activity to provide indirect employment. .All these corroborate [20] opinion that as population grows the need for jobs are also escalating making many people to derive their livelihoods from sand mining due to its economic gains while [21] pointed out that multiple utilizations led to an exponential consumption growth and this trend is expected to continue due to population growth and increasing standards of living.

Plate 1 1The site mining Operation

There are numerous challenges associated with sand mining operation in the state. For instance, to meet market demand of sand for rapid physical development of the city the farmland of neighbouring towns are now the current active sand mining sites due to the exploitation and abandonment of many mining sites within the fringe environment of the city The continuous clearing and removal of vegetation couple with the high volume of sand evacuated in each mining site do not only expose the land to erosion and degradation of an eyesore, with an offensive look but create loss of valuable fertile land and a well habitat able alterations which disrupts ecosystems and destroys native species as shown in [Plate 2]. At the same time continuous removal of sand from river bed increases velocity of flowing water which erodes beds and banks. In fact, [22] was of the opinion that as the velocity increases, the river bed can propagate both upstream and downstream for many kilometres lowering alluvial water tables while [23] added that stream sand mining causes destruction of aquatic and riparian habitat through large changes in channel morphology.

Plate 1 2The sand mining landscape

The interaction that takes place within the sand mining process of operations is so much conflicting The rate of acquiring land for mining activity that promotes physical development is totally in conflict with farming activity of which the soil fertility is threaten..At the same confrontation as the damage to river banks and general ecosystems become destructive to biological diversity. The increasing rate of market demand for sand which contributed to the various amount of money paid to government confer actually make many to agree that the sand mining activity enhance the revenue base of the government. This made many respondents to find it difficult to agree that the mining policy is of benefit to the society The vast economic potentials of the mining sector in Nigeria where government holds all mineral rights has been widely reported [14].

Conclusion and Recommendations

. You cannot protect the environment and mine it at the same time as the two variables are not mutually exclusive. This truly justified the fact that there are both positive and negative environmental impacts to sand mining In order to ameliorate this phenomenon, the following recommendations are made

Government through their agencies should embark on enlightenment campaign to educate the public including miners on the negative impacts of continuous mining through media such as Television, Radio and National Newspaper.

.Government should call for a high level decision making forum involving all stake holders to discuss the problem of sand and sand mining activities and come up with immediate robust solutions that can curb environmental damage.

Government must make it as a policy for miners to reinvest and repair old disused mine sites to reduce occurrence of landslides and when necessary to make all miners to spend part of the money on repairing environmental damage due to mining operations

References

[1] Saviour, N.M. (2012). Environmental impacts of Soil and Sand Mining: A Review. International Journal of Science, Environment and Technology.,**1 &3:** 125-134

[2] Langer WH (2003) A general overview of the technology of in-stream mining of sand and gravel resources, associated potential environmental impacts, and methods to control potential impacts, USGS Open-File Report OF-02-153

[3] UN DESA report (2015) Word Population Prospect

[4] United Nations, Department of Economic and Social Affairs, Population Division. World Urbanization Prospects: The 2014 Revision, Highlights (ST/ESA/SER.A/352).

[5] Department of Economic Development, Environmental Affairs, and Tourism, 2013. Draft Spatial and Environmental Management Guidelines for the Wild Coast of the Eastern Cape Province Republic of South Africa

[6] Lawal, P.O. (2011) Effects of Sand and Gravel Mining in Minna Emirate Area of Nigeria on Stakeholders Journal of Sustainable Development. **4:** 193-199

[7] Lupande, F. (2004) Zimbabwe: The High cost of Sand.The Herald **34:** 8 (201212 – 14,

[8] Akabzaa, T.M. (2000). Boom and Dislocation:The environmental and social impacts of mining in the Wassa West District of Ghana . Accra: Third World Network – Africa.

[9] Akabzaa,T. and Darimani, A. (2001). Impact of Mining Sector Investment in Ghana: A study of the Tarkwa Mining region

[10] Adekoya,J.A. (2003).Environmental effect of solid minerals mining. Journal of Physical Sciences, Kenya; 625 – 640.

[11] Adepelumi,A.A;et al (2006).Model tank electrical resistively characterization of LNAPL migration in a clayey-sand formation. Environmental Geology; 50. 1221 – 1233.

[12] Aigbedon,I.N.& Iyayi, S.E. (2007). Environmental effect of mineral exploration in Nigeria. International Journal of Physical Sciences; 2 (2), 033 – 038. [Online]

[13] Willis, K.G. & Garrod, D. (1999).Externalities from extraction of aggregates regulation by tax or land-use controls. Resources Policy, 25, 77–153.

[14] Merem EC,et al (2017).Assessing the Ecological Effects of Mining in West Africa: The Case of Nigeria. Int. J. Mining Engineer. Mineral Process. 6(1):1-19.

[15].Gbite A (2004).The Legal and Regulatory Framework for Mining in Nigeria. A paper presented at the National Mining Policy Dialogue Conference and Exhibition organized by Federal Ministry of Solid Minerals Development in Collaboration with the World Bank

[16] Ministry of Solid Mineral Development (2012).Inventory of Mining and Quarrying Titles in Nigeria, Mines Department, Abuja.

[17] Afolabi O et al, (2006) Urban expansion study using Geographic Information System G.I.S and remote sensing (R.S.) methods: A case study of Ado Ekiti. Environ-Link,Journal of Physical and Environmental Development. l (1).79-87.

[18] Oladipo I O et al (2015).Defining a Sustainable Sand Budget for a Burrow Pit activity in Nigeria International Journal of Pure and Applied Bioscience 3 (5) 169-177

[19] Kori, E.,et al, (2012). An Assessment of Environmental Impacts of Sand and Gravel Mining in Nzhelele valley, Limpopo Province, South Africa.3rd International Conference on Biological, Environmental and Chemistry. IPCBEE. V. 46.

[20] Onwuka, S. V.et al (2013). Socio-Economic impacts of Sand and Gravel Mining activities in Nsugbe, Anambra state Nigeria. Albanian Journal of Agricultural Science.12 (2), 229-235

[21] Aromolaran, A.K. (2012), Effects of sand mining activities on land in agrarian communities of Ogun State. Continental Journal of Agricultural Science.,**6(1):**

[22] Kondolf, M.G. (2007). Geomorphic and environmental effects of instream gravel mining. Landscape. Landscape and Urban Planning. 28: 2-3

.[23] Stebbins M (2006): Can Gravel Mining and Water Supply Wells coexist. Maine: University of Maine.